Journal

OF THE

AMERICAN VETERINARY MEDICAL ASSOCIATION

Radiographic Anatomy of the Canine Heart

A DESCRIPTION of the normal appearance and some pathologic variants seen in thoracic radiographs of dogs. Page 283

Ringworm Epidemic in Rural Community

A REPORT on the public health problem associated with a common mycotic infection of dogs and cats. Page 290

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Vol. 137 September 1, 1960 No. 5

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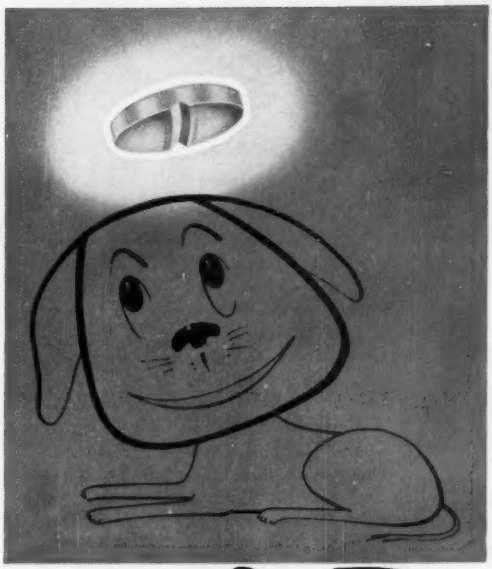

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OF THE
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MEDICAL ASSOCIATION

Vol. 137 No. 5 Sept. 1, 1960

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Correspondence

No Hospitality?

June 28, 1960

Dear Sir:

Please accept my compliments on the editorial "What, No Hospitality?". This is a mark of progress, and it took courage at a time when statistics show a steady increase in the use of alcoholic beverages. Dealers in the liquor industry are making statements such as I read a few days ago in the daily paper to the effect that thinking people have placed use of liquor on a higher plane than it formerly occupied.

Very truly yours,
s/A. K. KUTTLER, D.V.M.
Boise, Idaho

Satisfied AJVR Contributor

June 29, 1960

Dear Sir:

I would like to acknowledge receipt of my manuscript with the reviewer's criticisms and suggestions. The reviewer did an excellent job and should be commended for his straight-forward remarks on this manuscript which did require substantial rewriting. It is a pleasure to have a paper challenged for its style and clarity rather than to have it published without comment.

s/JOHN MCN. SIEBURTH
Narragansett Marine Laboratory
University of Rhode Island
Kingston, R.I.

Report on Feline Embryonal Sarcoma Questioned

July 15, 1960

Dear Sir:

Being a senior veterinary student and having just completed a course in neoplastic diseases, I was very much interested in the article on embryonal sarcoma in the cat in the June 15 issue of the JOURNAL, page 616. However, if I may, I would like to question the author's use of the term "sarcoma." According to present classification and terminology, "embryonal sarcoma" is not acceptable terminology for this type of neoplasm. The terms "embryonal nephroma" and "nephroblastoma" are currently used; however, "adenosarcoma," used by some authors, is the term used primarily in the description of the tumor.

The author states that this is the first case ever diagnosed in a cat. One case has been reported out of 140 tumor cases in the cat, according to Smith and Jones, *Veterinary Pathology*, 1957, 224-227.

s/JAMES E. HALL, *Student*,
A. & M. College of Texas

[Editor's Note: The author stated that "embryonal sarcoma . . . is not known to have been reported previously in the cat." He did not say that this was the first case ever diagnosed in a cat. However, the author did overlook the reference to the occurrence of this tumor as reported in *Veterinary Pathology* by Smith and Jones.]

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LEGISLATIVE

Transcript of Hearings Available

The transcript of hearings on medical and dental schools (scholarships, construction grants, and institutional research grants) held June 6-7, 1960, by the Subcommittee Health and Safety, House Interstate and Foreign Commerce Committee, has been published. It contains testimony of several deans, representatives of professional organizations, and government officials. Those interested may be able to obtain a single copy, free, by addressing the House Interstate and Foreign Commerce Committee, New House Office Building, Washington 25, D. C.

MISCELLANEOUS

Army VC Draft Call Probable

Sufficient veterinarians subject to the Universal Military and Training Act have not volunteered for 2 years active duty to meet the quota needed by the Army Veterinary Corps through March, 1961. It appears a "draft call" will be necessary to fill the January, 1961, quota (see JOURNAL July 15, 1960, adv. p. 16). It takes about 3 months to process an application for a commission and concurrent active duty. Therefore, it is suggested that draft-vulnerable veterinarians give serious consideration to applying, without delay, for appointment and active duty as a veterinary officer, Otherwise induction as a private could result. Selective Service is presently making a survey of all veterinarians under age 26 who are not fathers.

Dates Set for Army Courses

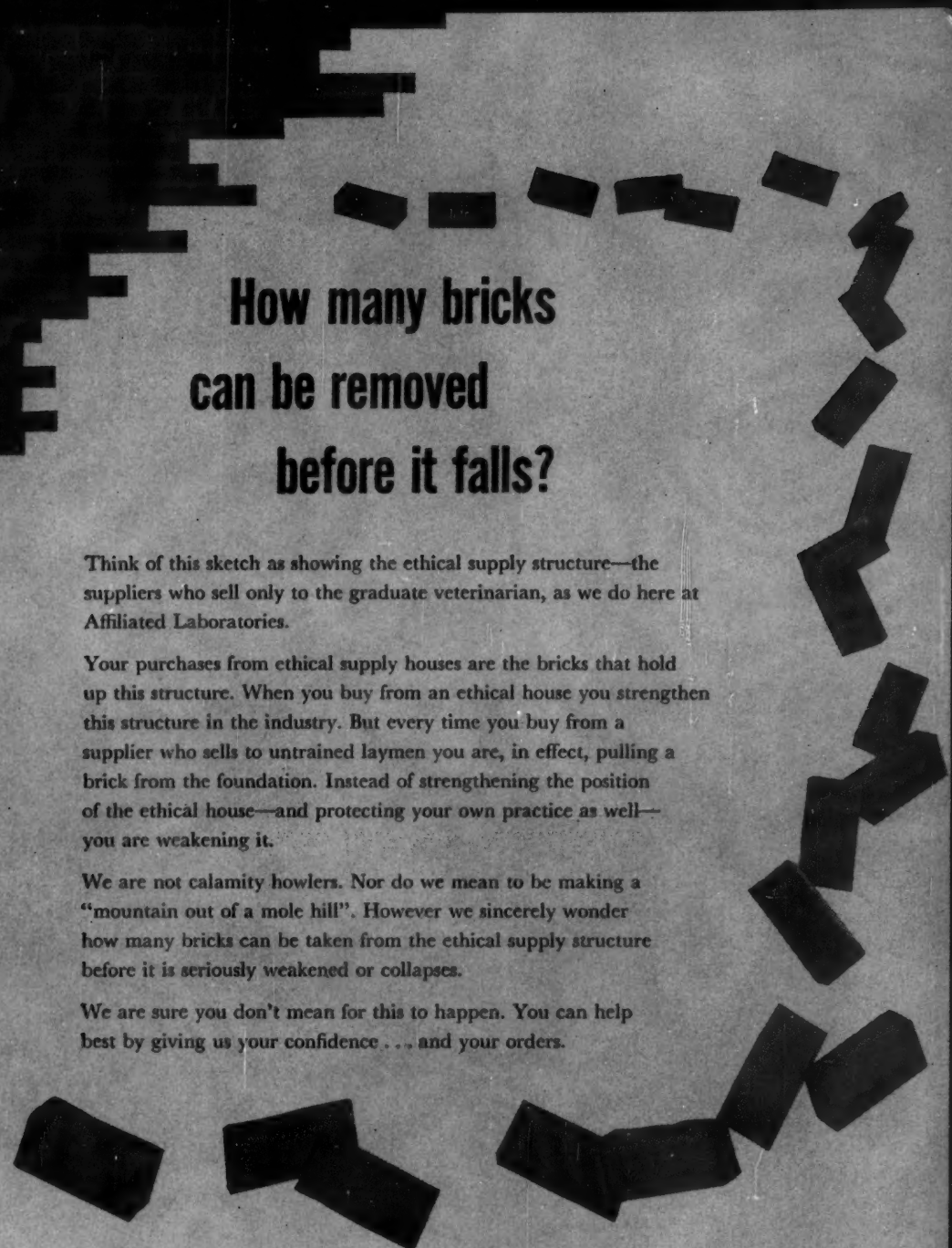
The dates for the 8-A-F9 Meat and Dairy Hygiene Refresher courses during February and May, 1961, for Army Veterinary Reserve Officers (see JOURNAL Aug. 15, 1960, adv. p. 16) are Feb. 5 to Feb. 18; and May 7 to May 20. Both will be at the U. S. Army Meat and Dairy Hygiene School, 1819 W. Pershing Rd., Chicago, Ill. Request for this active duty training should be submitted through Reserve channels to the appropriate Reserve Corps Headquarters.

Starting Salary for GS-9 Veterinarians Now $6,435

As a result of the increase in salary voted federal employees recently *(P.L. 86-568)*, the entrance salary for veterinarians now being accepted for employment in the Department of Agriculture in grade GS-9 is $6,435 (previously $6,135). Those already in second step of that grade as of July 1, 1960. date law enacted over the President's veto, now receive $6,600 (previously $6,135).

USDA Plans Screwworm Research Program

USDA reports a new research program on the screwworm will begin soon at the Kerrville, Texas, station. In USDA supplemental appropriation authorized for 1961, $200,000 was earmarked for this purpose (Senate Report No. 1832, 86th Congress; *P.L. 86-651*).



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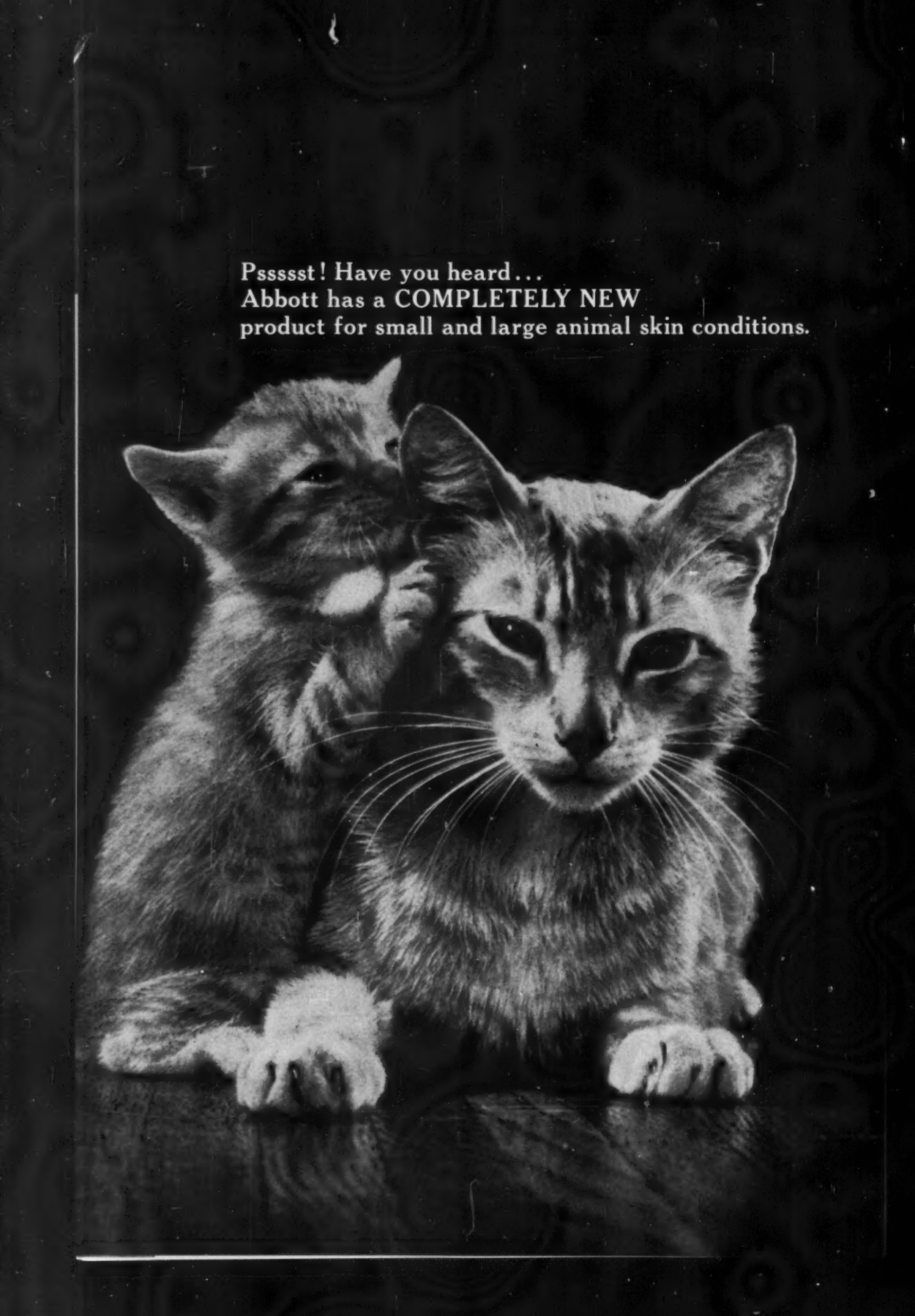
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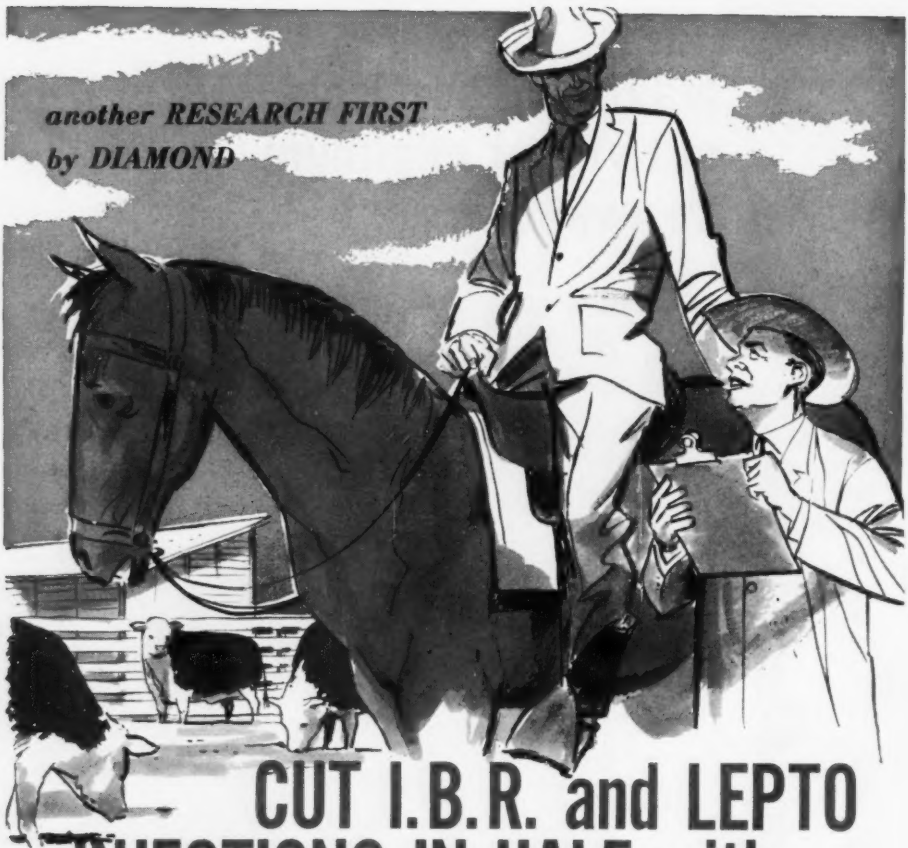

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1. Friis, C.W.: About Life Restoration of Newborn in The General Practice, Jrl. of The Danish Assn. of Vet., Nos. 2-15, Jan. 1959.

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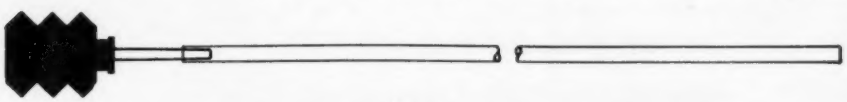

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1.Vigue, R. F., et al.: J. Am. Vet. M. Ass. 134:308 (April 1) 1959.
2.Vigue, R. F.: Personal communication.

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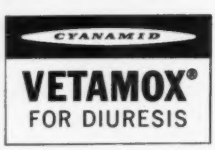

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References: 1. Pollock, S.: Vet. Med. 54:97 (Feb.) 1959. **2.** Hoffer, S. H.: Clinical report to CIBA. **3.** Weir, H. T., and Hazelrig, J. W.: Clinical report to CIBA.

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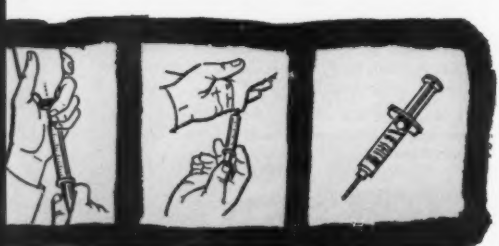

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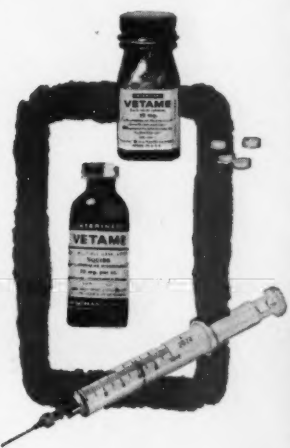

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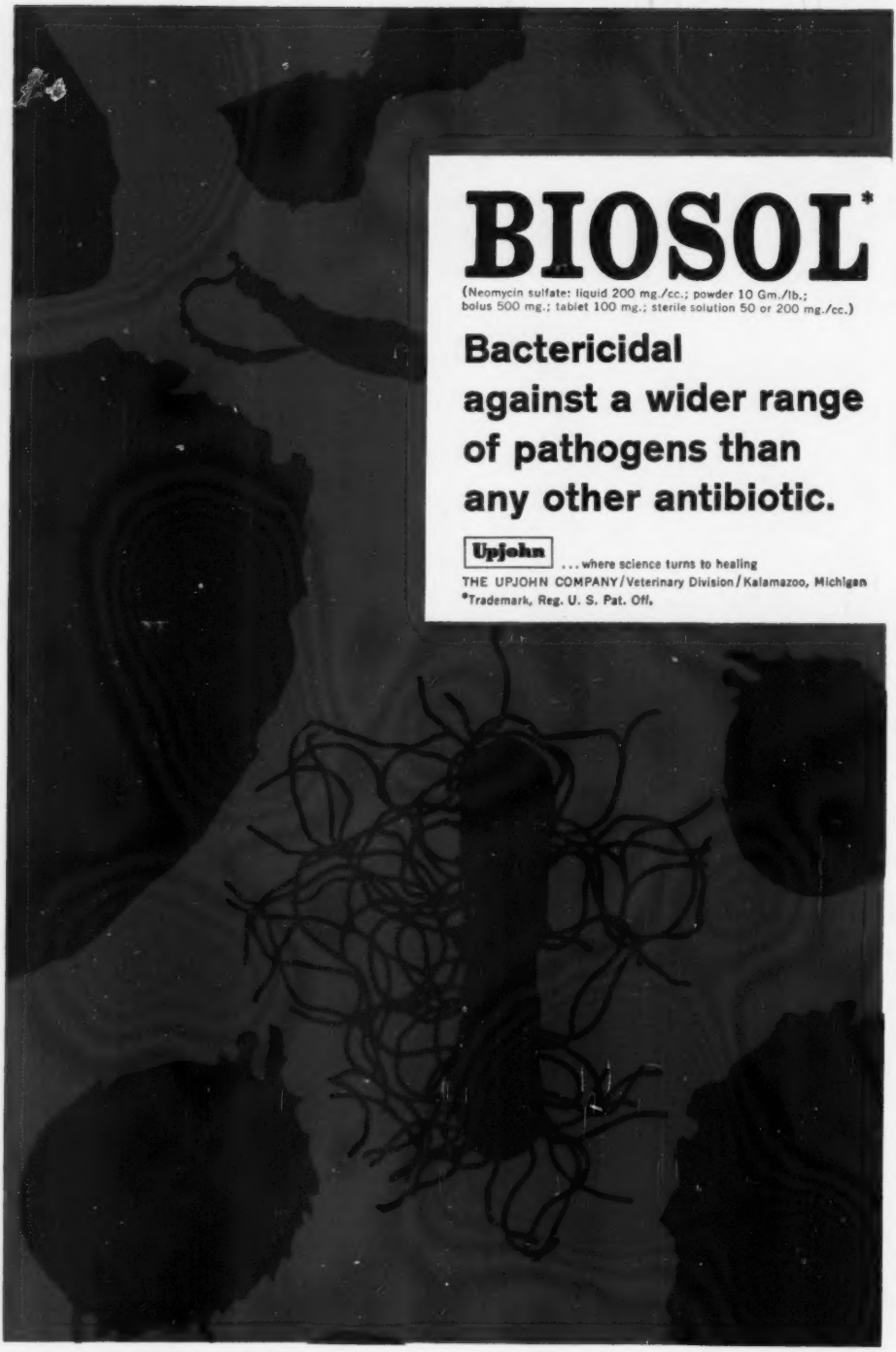
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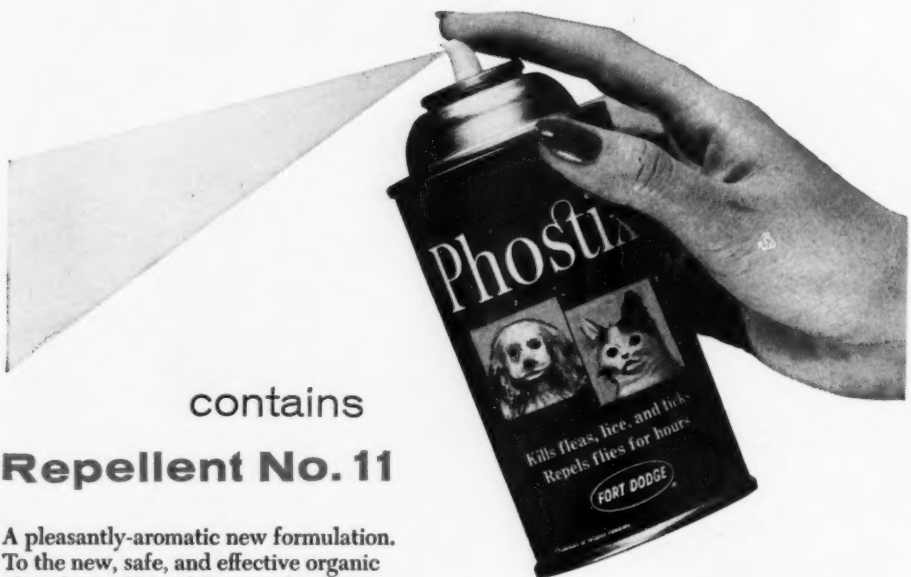

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Radiographic Anatomy of the

Canine Heart

—Part I

W. H. RHODES, V.M.D., M. MED. SC. (VET. RAD.)
D. F. PATTERSON, D.V.M.
D. K. DETWEILER, V.M.D., M.S.

RADIOGRAPHIC examination of the canine thorax is essential for complete understanding and diagnosis of heart disease. It is as integral a part of heart examination as palpation, auscultation, percussion, and electrocardiography. Radiographs of good quality permit evaluation of changes in size, shape, and position of the cardiac silhouette as well as alterations in the lungs and great vessels. Lateral thoracic radiographs often provide information useful in evaluating the heart. The purpose of this paper is to describe the normal appearance and some pathologic variants seen in this view.

Literature Review

There have been few publications on the interpretation of the radiographic cardiac silhouette. In 1953, a description of the radiographic anatomy of the canine heart and great vessels, based on original postmortem studies employing contrast medium, was published.[1] This study constitutes the basis for cardiac radiography in the dog; it includes a review of the pertinent literature published up to 1953. Two later communications[3,4] contributed to the clinical interpretation of cardiac radiographs, emphasizing various changes occurring in disease. A system of measurements of lateral thoracic radiographs taken at a focal distance of 120 cm. was proposed[2] for use in evaluating the relative dimensions of the heart and its chambers. Values obtained from 1,406 dogs were presented.

Normal Cardiac Silhouette

In evaluating a lateral thoracic radiograph, structures external to the thorax are studied first. It is important that they be examined carefully, since secondary or unrelated pathologic changes not involving the thoracic viscera may influence the final diagnosis (apparent respiratory distress may be secondary to such diverse causes as rib fractures or an enlarged abdominal viscus). Conformation of the thorax should be considered in evaluating the size and position of the cardiac silhouette since there is considerable variation in dogs of different body types. In dogs with narrow, deep thoraxes, such as Whippets and Setters, the cardiac silhouette is more upright and narrow than in short dogs with wide shallow thoraxes, such as English Bulldogs.

An angiocardiogram of the right ventricle in early diastole is shown (fig. 1A). A narrow concentrated flow of contrast medium is seen passing through the tricuspid valve. The border of the right side of the

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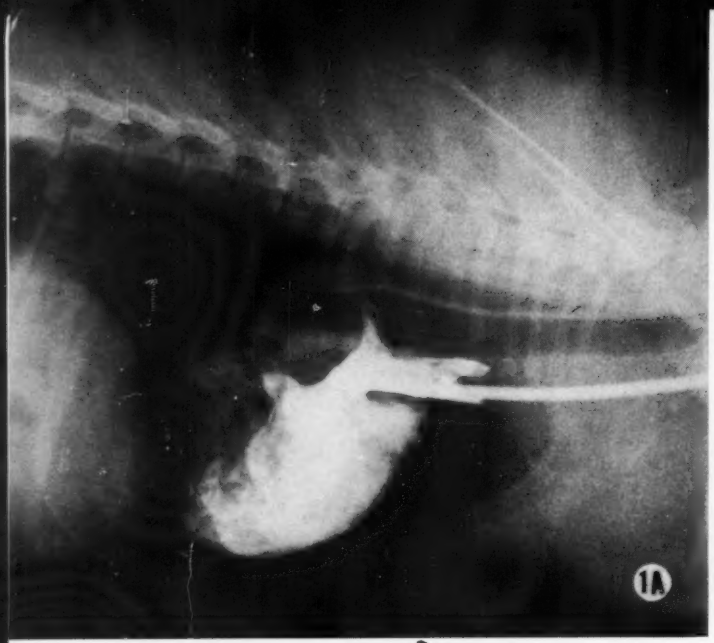


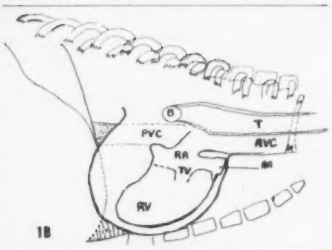


Fig. 1A—Contrast medium is shown in the right side of the heart (diastole).

Fig. 1B—Tracing of figure 1A; RA—right atrium, AA—auricular appendage, TV—tricuspid valve, RV—right ventricle, AVC—cranial vena cava, PVC—caudal vena cava, B—mainstem bronchi, T—trachea, and CPL—cardiophrenic ligament.

heart is curved sharply where the ventricular wall contacts the ventral thoracic wall.

In right ventricular systole (fig. 2A, 2B), the contracting ventricle has forced the contrast medium into the pulmonary arteries. The sinus of Valsalva is seen as a vascular expansion immediately distal to the pulmonary artery valves.

In a later radiograph (fig. 3A, 3B), the contrast medium has returned to the left side of the heart via the pulmonary veins where they enter the left atrium. The radiograph is of early left ventricular systole. In left ventricular systole, the heart wall thickens and the ventricular volume decreases. The aorta is filled with

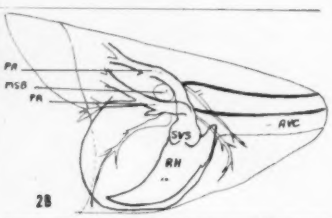
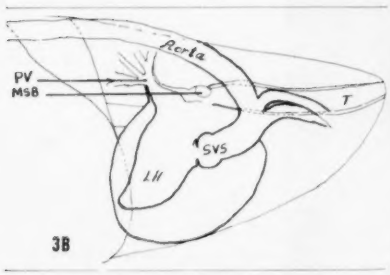


Fig. 2A—Contrast medium is shown in the right side of heart (systole).

Fig. 2B—Tracing of figure 2A; RH—right side of heart, SVS—sinus of Valsalva, PA—pulmonary artery, MSB—main stem bronchi, and AVC—cranial vena cava.



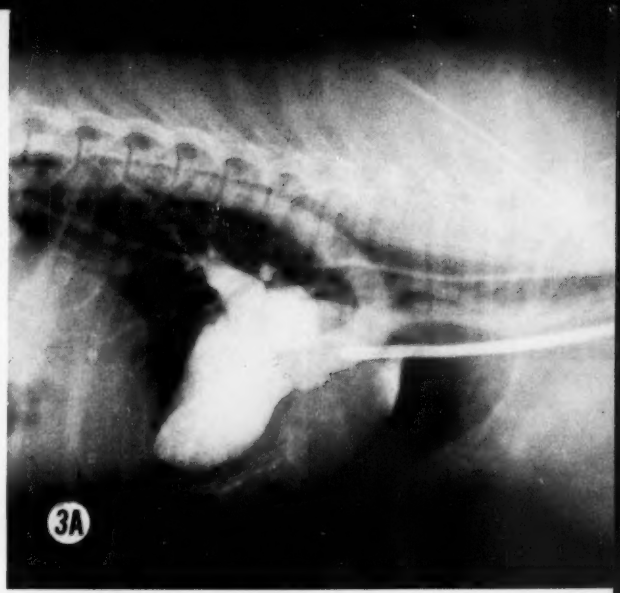


Fig. 3A—Contrast medium is shown in the left side of the heart (early systole).

Fig. 3B—Tracing of figure 3A; PV—pulmonary veins, LH—left side of the heart, SVS—sinus of Valsalva, T—trachea, and MSB—main stem bronchi.

contrast medium. A sinus of Valsalva can be seen immediately distal to the aortic valves. The border of the left side of the heart is less curved than the right side.

In a lateral thoracic radiograph, the approximate location of the 4 cardiac chambers may be indicated by drawing a line from the middle of the heart base to its apex. The right side of the heart is cranial and ventral to this line. The left side of the heart is caudal and dorsal to it. A second line drawn at right angles to the first approximately two fifths of the distance from the base to the apex serves to separate the atrial and ventricular shadows. A tracing of a thoracic radiograph in which the heart has been schematically divided into its 4 chambers by this method is shown (fig. 4). The cranial border of the cardiac silhouette is formed by the right ventricle and atrium, the caudal border by the left ventricle and atrium. Both the cranial and caudal borders curve inward at the base of the heart and then become continuous with the vascular shadows of the cranial and caudal mediastinum. Thus the silhouette of the base of the heart narrows in the region of the atrioventricular groove and widens when it becomes confluent with the venae cavae and pulmonary veins, producing a "waistlike" appearance in the region of the atria.

The cardiac silhouette varies with body type. When the apex of the heart is directed more caudally, the angle at the "waist" of the left (caudal) heart border becomes more acute and that at the right (cranial) border becomes more obtuse. In an upright heart in which the apex lies more directly under the base, these angles are affected oppositely (fig. 5).

Where the trachea bifurcates over the heart base, the bronchi can be seen as one (occasionally 2 slightly offset) round, air-filled structure. The trachea bends slightly ventrally at its caudal extremity and bifurcates over the heart base. The long axes of the trachea and thoracic spine form an angle at the thoracic inlet and diverge caudally. The divergence increases in dogs with a relatively large dorsoventral thoracic diameter and decreases in breeds such as the Basset Hound with relatively small dorsoventral thoracic diameter. This relationship is important in evaluating cardiac

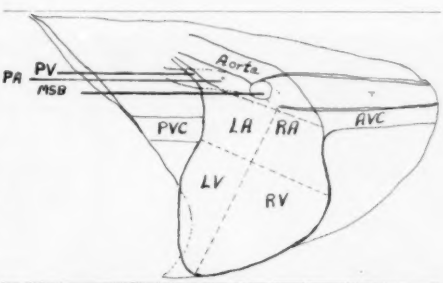


Fig. 4—Drawing shows schematic division of the heart; RA—right atrium, LA—left atrium, AVC—cranial vena cava, PVC—caudal vena cava, PA—pulmonary artery, PV—pulmonary vein, T—trachea, MSB—main stem bronchi, RV—right ventricle, and LV—left ventricle.

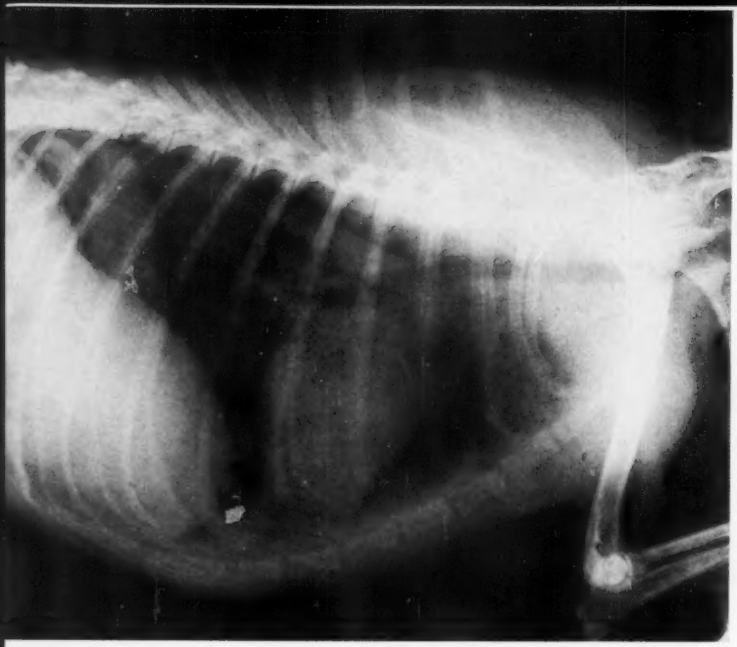


Fig. 5—In radiograph, the upright heart of a normal Collie (deep thorax) is seen.

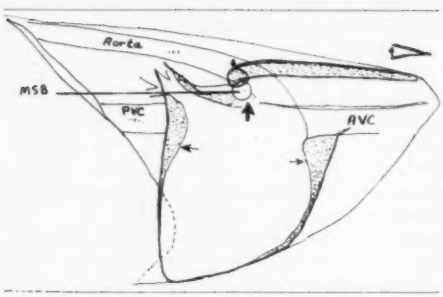
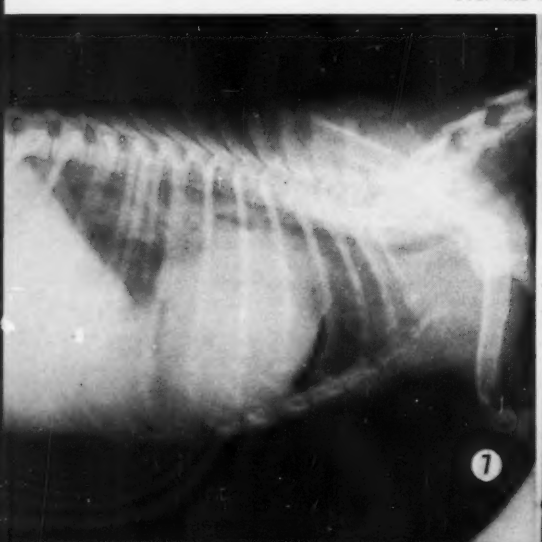
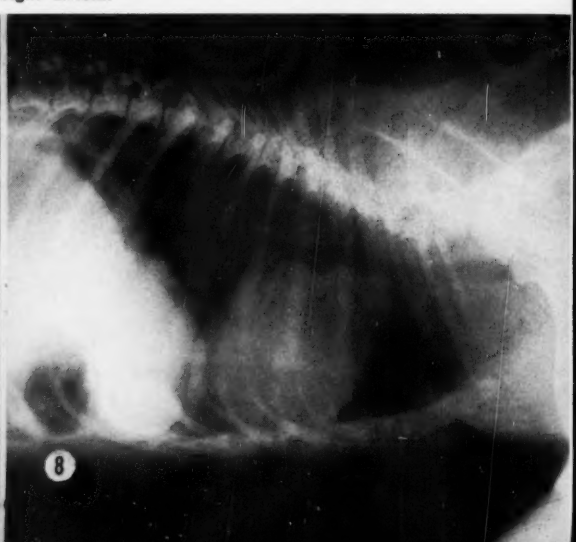


Fig. 6—The inner diagram depicts a normal heart, great vessels, and trachea. The outer stippled area represents the outline of an enlarged heart. The arrows indicate the directions in which the heart border and trachea are displaced in cardiac enlargement. The angle above the illustration indicates the relationship of the long axis of the trachea to the long axis of the thoracic spine and the direction the trachea is displaced in cardiac enlargement.

Fig. 7—Congenital stenosis of the aortic valve in a female Boxer, 7 months old. A marked enlargement of the left side of the heart is causing straightening of the caudal border of the heart and elevation of the trachea.

Fig. 8—Congenital pulmonic stenosis with a patent foramen ovals in an English Bulldog, 2 years old. The border of the right side of the heart is straightened and the trachea elevated over the right atrium.





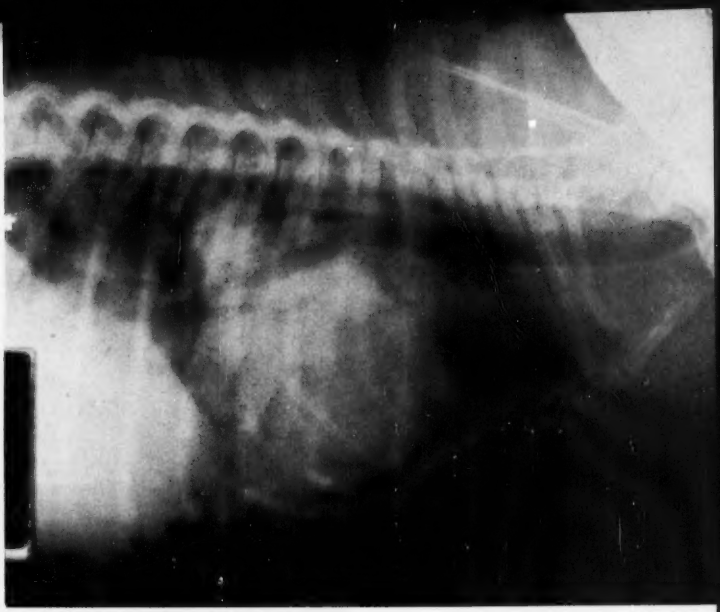


Fig. 9—Disproportionate left atrial enlargement, with the atrium bulging dorsally between elevated main stem bronchi. This occurred in a male Cocker Spaniel, 10 years old, with fibrosis and insufficiency of the mitral valve, severe myocardial disease, and congestive heart failure. There is generalized cardiac enlargement as well.

enlargement (fig. 6). The aortic shadow separates from the cardiac silhouette at the border of the right side of the heart, cranial to the tracheal bifurcation, and continues dorsally and caudally toward the thoracic spine (fig. 3A, 4).

The pulmonary artery, which arises from the right ventricle, becomes visible as it divides at the level of tracheal bifurcation. It can be seen going to all lobes of the lungs. The 2 largest pulmonary artery branches serve the left and right diaphragmatic lung lobes. The left branch appears to pass dorsal and the right branch ventral to the mainstem bronchi. Since the pulmonary arterial tree arises from a point immediately cranial to the tracheal bifurcation, pulmonary vascular shadows which appear to emanate from the tracheal bifurcation should be considered as pulmonary arteries (fig. 2A, B).

The pulmonary veins, which usually are not seen as clearly as arteries, converge upon the left atrium. The latter is caudal to the area from which the pulmonary arteries arise (fig. 3A, B).

Radiographic Manifestations of Cardiac Pathology

When the heart is generally enlarged, both cranial (right) and caudal (left) borders are straightened, causing the

Fig. 10—Congenital stenosis of the pulmonic valve in a male terrier, 15 months old. Contrast medium is present in the dilated right atrium, thick-walled right ventricle, and enlarged pulmonary arteries. The trachea is deviated dorsally especially over the base of the right side of the heart. The outflow tract of the right ventricle, just below the pulmonary valve, contains only a thin stream of contrast medium, indicating narrowing of the lumen due to hypertrophy of the ventricular myocardium in this area. An intravenous catheter has been passed down the jugular vein and lies in the right atrium.

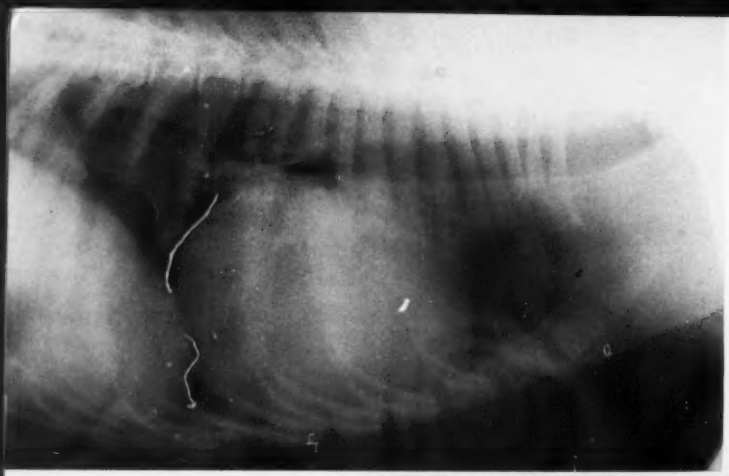


Fig. 11—Pericardial effusion due to pericarditis in a male German Shepherd Dog, 1 year old. The heart shadow is generally rounded in appearance, particularly in its caudal aspect, giving the heart a pumpkin-shaped appearance. Over 1,000 cc. of blood-tinged fluid was removed from the pericardial sac in this dog, after which he recovered.

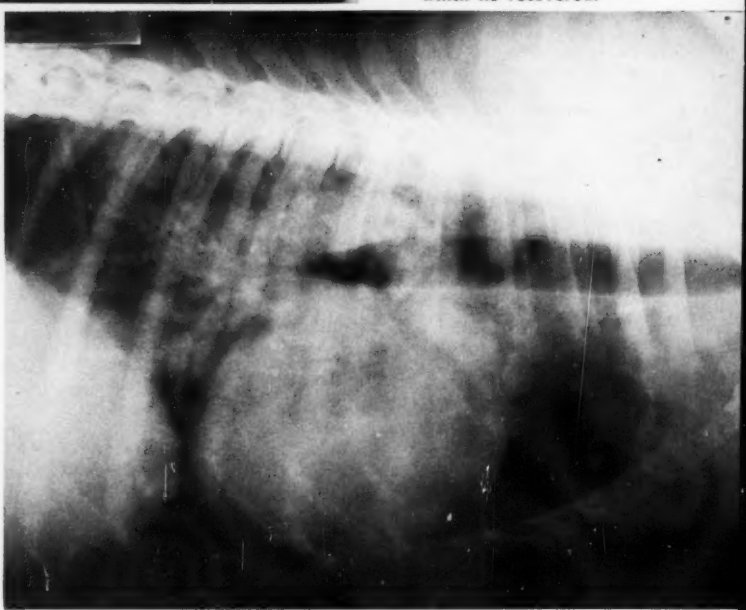


Fig. 12—Enlargement of the pulmonary arteries and right side of the heart in a Rottweiler, 5 years old. Notice the increased density and size of the pulmonary arteries. The left pulmonary artery can be seen curving dorsally and caudally over the trachea, cranial to the tracheal bifurcation. The right pulmonary artery viewed on end appears as a round, radiopaque structure just below the tracheal bifurcation. These changes are characteristic of severe heartworm infection.

waistlike appearance adjacent to the heart base to become less pronounced or to disappear. When the right side of the heart is enlarged, this straightening of the cranial border causes the angle formed by the vascular shadows of the cranial mediastinum and the cranial heart border to become less acute. Similarly, when the left side of the heart is enlarged, the angle formed by the pulmonary veins as they enter the left atrium and the caudal heart border becomes more obtuse. Thus, when either the right or left side of the heart is enlarged primarily, the cranial or caudal aspect, respectively, of the waist becomes less pronounced or is lost (fig. 6-8).

The trachea and main stem bronchi over the base of the heart are deviated dorsally as the dorsoventral diameter of the heart increases. The angle formed near the thoracic inlet by the long axes of the thoracic spine and the trachea becomes more acute. In cases of extreme cardiac enlargement, the tracheal shadow appears to be relatively close to, or in contact with, the thoracic spine shadow (fig. 7-10).

When the right atrium is disproportionately enlarged, the trachea is bowed upward cranial to the main stem bronchi and often one main stem bronchus (right) is elevated so that the end-on view of 2 bronchi are seen to be separate rather than confluent (fig. 8, 10, 12). When the left atrium is disproportionately enlarged, the left

main stem bronchus is elevated. Often the left atrial shadow can be seen bulging dorsally between the 2 air-filled bronchi, which now appear as a V-shaped structure with one branch above the other (fig. 9).

Pericardial effusion may result in extreme generalized enlargement of the cardiac silhouette. In most cases, the heart shadow is unusually homogenous, losing its normal contour and becoming rounded in outline. The heart shadow may assume enormous proportions when large quantities of fluid are present (fig. 11).

Enlargement of the pulmonary arteries may occur in certain types of congenital (Eisenmenger's complex, patent ductus arteriosus) and acquired (*Dirofilaria immitis* infection) cardiac disease. When enlarged, these vessels, seen originating from the area cranial to the tracheal bifurcation, become more obvious because of their increase in size and density. The left pulmonary artery, when enlarged, often is most evident as it passes dorsally over the trachea cranial to the tracheal bifurcation. An enlarged right pulmonary artery viewed on end as it enters the hilus of the lung, may appear as a round, radiopaque shadow immediately ventral to the tracheal bifurcation (fig. 12).

Summary

Radiographic examination of the thorax is essential to the complete understanding of cardiac disease in the dog. The cardiac silhouette in the lateral radiograph can be schematically divided into its various chambers. Changes in the cardiac silhouette and surrounding viscera characteristic of various types of cardiac disease are described.

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An Abdominal Tumor in a Dog

— *A Case Report*

H. W. PILCHER, D.V.M.
John C. YATSOOK, D.V.M.

A FEMALE COLLIE, 10 years old, was presented for examination because of an extremely distended abdomen. The owner stated that he had noticed the increase in the size of the abdomen twice throughout the summer of 1959. Both times, the distention receded. The present distention occurred in late November, and in 10 days had increased alarmingly in size. The dog appeared to be stretched to the maximum in the abdominal region.

The body temperature was 102.2 F.; heart rate slightly accelerated, and respiration labored, due to the great pressure on the thoracic cavity. Appetite, urination, and defecation were normal. The great distention rendered palpation useless. Paracentesis was performed, but no fluids could be aspirated.

The patient was anesthetized with a combined pentobarbital sodium and thio-

The authors are engaged in small animal practice in Kansas City North, Mo.

pental sodium agent in combination with ether and oxygen. Exploratory laporatomy was performed.

A 3½-inch incision was made on the median line, exposing a large mass. Palpation was performed through the incision which was then extended from the xiphoid cartilage to the symphysis pubis. Even with this large incision, it was difficult to remove the mass from the body cavity. The mass was diagnosed as a malignant neoplasm which had vascular connections with the spleen, omentum, and large intestine. It originated in the region of the cervix and the body of the uterus.

With the aid of electric cautery, all connections of the mass to the organs were ligated and cut. The ovaries and horns of the uterus were also removed.

When the mass was removed from the body cavity, respiration rate returned to normal. However, a state of shock ensued. To combat the shock a hydrocortisone preparation was given, along with intravenous fluids. A blood transfusion was given the evening following surgery; however, the patient died 2 days later.

The neoplastic mass weighed 30 lb. When spread out following removal, it measured over 2 ft. in width.

Torsion of the Uterus in a Cat

— A Case Report

Albert SINGER, V.M.D.

IN OCTOBER, 1959, a 4-year-old cat was examined because she had given birth to 2 dead kittens the previous day. A stale, bloody discharge was present around the vulva. The body temperature was 100 F. No other clinical signs were apparent. Abdominal palpation indicated that more kittens were present.

The owner stated that, 5 days prior to birth of the dead kittens, the cat had run about wildly, lain on her side, and kicked her legs vigorously, presumably because of pain. During these 5 days, she became listless and inappetent.

The cat had given birth to 2 normal litters before she was 2 years old. Since that time, she had become pregnant on 2 other occasions, but she had aborted at about the seventh or eighth week of pregnancy.

Dr. Singer is a general practitioner in Morris Plains, N.J.

Administration of posterior pituitary extract caused expulsion of another dead kitten in about an hour. The decomposed appearance of the kitten and fetal membranes suggested that the kitten had been dead for at least 2 days. At least 1 more kitten was still palpable in the abdomen. Subsequent injections of posterior pituitary extract failed to expel any more kittens. The owner was informed of the need for a cesarotomy, and the cat was operated on the following morning.

After exposure of the viscera via a midline incision, the right horn of the uterus was found to have a deep grayish purple discoloration. The left horn was normal in color and devoid of any contents. Examination of the ovarian end of the involved horn revealed twisting of the vessels and tissues about 180 degrees. An ovariohysterectomy was performed, and an uncomplicated recovery ensued.

A Ringworm Epidemic

Caused by Microsporum canis in a Rural Community

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Kenneth D. QUIST, D.V.M. M.P.H.

EPIDEMICS of ringworm infection in the human population are generally associated with the anthropophilic dermatophytes that are readily spread by person-to-person contact. The most notable species involved in this group is *Microsporum audouini.* The zoophilic dermatophytes that infect man result from animal-to-human contact and do not readily pass from person to person.

The following report illustrates an epidemic that occurred in a rural community and points out a public health problem associated with a common mycotic infection of dogs and cats, *Microsporum canis.*

History and Methods

In August, 1959, the Nebraska State Health Department received information from a physician in a southwestern Nebraska town which had an approximate population of 850 persons. There was an unusually high incidence of ringworm in the community and surrounding rural areas, and the mosquito population was higher than normally expected in the area.

A visit to the town was made in August, 1959, and the physician was contacted. He had arranged for several patients to be at his office that afternoon. Seven patients were examined under Wood's light, and 6 had lesions which fluoresced. Lesions were located on the trunk, extremities, and scalp. Noticeable, especially on the children under 10 years of age, were numerous mosquito bites. Many of the bites seemed to be the foci of a new mycotic lesion.

Scrapings and infected hairs from 6 patients were obtained and cultured on Sabouraud's agar. *Microsporum canis** was isolated from 3 patients' scalp lesions. The cultures from body lesions were negative or overgrown with contaminants. A later culture, taken in November from a body lesion, was positive for *M. canis.*

Two dogs and 12 cats with which these patients had contact were examined under Wood's light. One litter of 3 kittens showed fluorescence under Wood's light, but their mother did not. The town had no local veterinarian. Three veterinarians in a

TABLE 1—Age and Sex Distribution of Cases of Ringworm and the Projected Case Expectancy

Age group	Survey population		Known school-expected adult population		Cases by age & sex in survey		Per cent infected of survey population	Expected cases in total population
	M	F	M	F	M	F		
0-5	20	15	55	48	4	1	14.28	15
6-10	10	14	49	46	3	2	20.83	20
11-15	14	9	48	38	1	0	4.35	4
16 plus	75	76	260	263	0	2	1.32	7
Total:	119	114	412	395	8	5	....	....

From the Division of Communicable Disease Control, Department of Health, Lincoln, Neb.

*The authors acknowledge the assistance of the CDC Mycology Laboratory, Chamblee, Ga., and of the Department of Microbiology, College of Medicine, Omaha, Neb., for identification of cultures. They also thank Mrs. Barbara Anspaugh for her assistance in making the survey and typing the report.

TABLE 2—Sites of Lesions on Individuals

Site	No. of individuals
Scalp	3
Multiple body & scalp	5
Extremities	11
Extremities and trunk	8
Trunk	8
Face	5
Unknown (inadequate information)	2
Total	42

nearby town 23 miles distant were contacted for information regarding the local prevalence of ringworm infections in animals. They reported that they had seen no cases of ringworm among the pets of that community.

A team of investigators returned to the town in November to do further epidemiologic work. A survey form was devised to include data on family numbers, age, sex, presence or absence, onset, and duration of skin lesions, and data concerning pets. All families in randomly preselected blocks of the city were interviewed by visits to the homes and by a telephone survey. The survey sample included approximately 25 per cent of the town's population.

Due to the completion of a nearby construction project, many persons had left town in the early '50's, and the 1950 census of 1,239 was no longer reliable. An accurate school census, completed during the summer of 1959, indicated that there were 284 children, 15 years old and younger, within the city limits. The total survey sample included 233 persons of whom 82 were 15 years old or under. By means of a ratio of the survey child population to the total survey population as compared with the known 1959 school census to the unknown total population, the population of the town was determined to be approximately 807 persons.

Age groups of persons surveyed, number of cases of ringworm, expected population, and expected cases of ringworm in the community are shown (table 1).

Following completion of the survey, a list of patients who had ringworm during 1959 was obtained from the local physician. Including these cases with those found in the survey, the following information was compiled. Months of onset and numbers of cases were: June, 11; July, 14; August, 5; September, 2; and October, 1. Approximate durations of skin lesions in 25 patients were; less than 1 month, 8; 1 to 2 months, 3; 2 to 3 months, 10; and more than 3 months, 4.

Of the 23 households with infections, 13 had either dogs or cats on the premises. Skin infections were not visually evident at the time of the survey in November. Only 3 of the households indicated the presence of recent skin infections in their pets. No skin infections had been seen by a veterinarian, except the litter of 3 kittens examined under a Wood's light and found to have infected hairs in the facial region.

Five households gave histories which might incriminate either their pets or neighbors' pets as sources of infection. In other households, intimate contact between children (sleeping together) or mothers (3) and infected children indicated a person-to-person spread of the infection.

Summary and Conclusions

It was evident after the completion of the survey that we should have cultured hair specimens from family pets with no visible lesions. It has been reported that pets may be inapparent carriers of *Microsporum canis*.[1] Infected hairs are not visible under the Wood's light and must be cultured to establish or rule out infection.

Results of the epidemiologic survey indicated that this community had undergone an epidemic of considerable proportion with respect to an organism of animal origin which is generally involved in sporadic cases. It also indicates the need for understanding the problem in order to minimize spread within and between families of the community. Cultural techniques would have furnished additional information as to the true incidence of inapparent animal infections.

The etiologic agent, *M. canis*, confirms the animal source of the original cases. Multiplicity of cases within households and the epidemiologic findings seem to indicate a high degree of person-to-person spread. Factors favoring person-to-person spread were the organized summer recreation program, minimum amount of body covering in warm weather, high mosquito population with resulting mechanical irritation of the mosquito bites, and intimate contact between children sleeping together or mothers caring for infected children.

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The Action and Use of

Bulbocapnine in Cats and Cattle

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G. K. L. UNDERBJERG, D.V.M., PH.D.

BULBOCAPNINE* (BCN) is the active principle of Corydalis sp. and is an alkaloid with a long history as a folk remedy for the relief of such maladies as pain, hyperexcitability, and hyperesthesia.

In early tests with small laboratory animals, this principle was seen to produce a cataleptoid state in frogs, guinea pigs, rabbits, and cats. In relatively high doses, administration was accompanied in some of these species by excessive lacrimation and salivation, slowed respiration, and a weakening of the heart, this latter effect being especially noticeable in cats.[11] However, with lower dosages, blood pressure and respiration were affected very little in several species of laboratory animals.[10] When higher doses, ranging up to 60 mg./kg. of body weight, were injected intraperitoneally in dogs anesthetized with ether, the arterial blood pressure was reduced an average of 37 per cent and venous pressure 50 per cent within 30 minutes.[9] The $l.d._{50}$ on subcutaneous injection in mice is 195 mg./kg.[10]

The biochemical mechanism of action of BCN is not known at this time, but its chemical structure somewhat resembles that of apomorphine. Adrenalin and acetyl-B-methacholine chloride were less effective in altering blood pressure after BCN administration in dogs, but the effectiveness of pitressin and histamine was not changed;[9] BCN action was abolished by benzedrine in cats and rats,[12] and by 1,2,3,4 tetrahydro-2-naphtylamine in cats.[8]

Probably, the site of action is within certain brain centers, possibly within the posterior portion of the corpus striatum since, when portions of the brain were injured by electrocautery in mice, injury to this area resulted in a decreased response to BCN. Injury to both sides of the ventral portions of the midbrain, to the cerebrum, or to the cerebellum did not alter the response to BCN.[6,7] Electroencephalograms taken over the cortical areas in rabbits after the administration of large amounts of BCN had an initial increase in activity followed by periods of low activity during catalepsy. When the concentrations reached toxic levels, these periods were interrupted by sporadic outbursts of high activity during convulsions.[5] Motion sickness has been reported prevented or delayed in dogs by BCN.[2]

Doses of BCN from 1.0 to 1.4 mg./kg. of body weight subcutaneously in horses were shown to produce a mild state of catalepsy with a moderate degree of analgesia lasting 40 to 80 minutes.[3] Variable, but no untoward, effects were observed on the pulse, respiration, and peristalsis. Bulbocapnine was considered to have merit in calming horses during surgery or painful maladies, but was not considered to have the analgesic properties of morphine. Other work with cats indicated the minimum effective dose range of BCN to be 2 to 4 mg./kg. with the ratio of the minimum effective dose to the minimum lethal dose ranging from 1:15 to 1:57.[1] Cataleptoid rigidity and apathy were noticed with the minimum effective dose, and occasional miauling, vomiting, defecation, and micturition. Lethal doses resulted in strychnine-like convulsions.

Probably, further development of this compound for clinical application was not made earlier because solutions were unstable unless the BCN was complexed, as was recently accomplished. While this alkaloid may have applications in chemical restraint as do tranquilizers, it is not in the tranquilizer category since, in the effective dose range, it produces a state of catalepsy.

It was the purpose of this study to ascertain some of the possible uses of BCN, and some of its actions on body functions.

The BCN was used in a 2.5 per cent aqueous solution. The electrocardiograms were made as described by Burch and Winsor.[4] Statistical analyses were made in a standard manner.[13]

Results

Cats.—A total of 15 cats was given 15 mg./kg. of BCN subcutaneously and observed for 1 day. The cats ranged from 1½ to 5½ kg. in weight, 6 months to maturity in age, and were of both sexes. Catalepsy lasted from 1 to 2 hours, starting 15 minutes after injection. During this period, minor manipulations such as clipping and the usual handling were carried out without difficulty. The cats remained in a fixed position unless a fairly strong stimulus was applied. Side effects such as nausea or purgation were not observed, but most of

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Cordine, a stabilized injectable preparation of bulbocapnine (3, 4 methylene dioxy-6-methylapomorphine), is formulated by the S. E. Massengill Co., Bristol, Tenn.

TABLE 1—Cat Electrocardiograms as Influenced by Bulbocapnine (BCN)*

Wave	Intervals — in seconds	
	Before administration of BCN	1 hour after administration of BCN**
P	.040 ± 0	.040 ± 0
PQ	.083 ± .017	.086 ± .037
QRS	.020 ± 0	.037 ± .017
QT	.166 ± .068	.183 ± .111
T	.086 ± .037	.091 ± .089
Total	.371 ± .109	.343 ± .224
	Axis deviations	
	12 deg. ± 105	58 deg. ± 58

Values are ± standard deviation. None of the values was statistically significant ($p > .05$).
*Based on 7 cats; **bulbocapnine dosage used was 15 mg./kg. body weight.

the cats salivated immediately following administration of the drug. Approximately one third of the cats cried out as if emotionally disturbed. Often the cats would snarl on provocation but would not strike. Shortly thereafter they again resumed the cataleptoid state.

The electrocardiograms of 7 cats before and 1 hour after the above dosage of BCN (table 1, 2) did not indicate any embarrassment of cardiac function. No differences in the amplitudes and axis deviation were discernible, although the R waves tended to be larger in most leads. The QRS interval appeared lengthened, indicating a moderate prolongation of ventricular contraction time.

Seven cats were given sufficient sodium pentobarbital solution (32.5 mg./cc.) intravenously to produce surgical anesthesia, both with and without a predosing of BCN, 15 mg./kg. of body weight subcutaneously 1 hour prior to the administration of the anesthetic dose. With the predosing of BCN, 25.2 ± 6.5* mg./kg. of sodium pentobarbital was required, whereas 30.5 ± 7.5 mg./kg. was required without. No significant difference ($p > .05$) was noted between these amounts, although the predosing reduced the amount required, an average of 5.3 mg./kg. The duration and nature of the surgical anesthesia did not appear to be affected by BCN and lasted 2 to 3 hours with or without predosing. However, it was much easier to clip the cats, enter the vein, and approximate the dosage of sodium pentobarbital needed for anesthesia after predosing with BCN, thus providing a safety factor.

A cat given BCN, 20 mg./kg. of body weight subcutaneously remained in a cataleptoid state when 5 mg. of N-allylnormorphine hydrochloride was given intravenously 30 minutes later, indicating that these

* ± standard deviation.

TABLE 2—Cat Electrocardiograms as Influenced by Bulbocapnine (Based on 7 Cats)

Wave	Deflections — in millivolts					
	Leads					
	I	II	III	AVR	AVL	AVF
P						
Before BCN	.071 ± .026	.114 ± .037	.100 ± 0	.093 ± .020	.086 ± .024	.079 ± .026
After BCN*	.079 ± .026	.157 ± .073	.100 ± 0	.100 ± 0	.079 ± .026	.114 ± .037
Q						
Before BCN	.121 ± .099 (6/7)	.029 ± .049 (2/7)	0 (0/7)	0 (0/7)	0 (0/7)	0 (0/7)
After BCN	.136 ± .207 (5/7)	.029 ± .049 (2/7)	.029 ± .049 (2/7)	0 (0/7)	0 (0/7)	0 (0/7)
R						
Before BCN	.129 ± .160 (4/7)	.429 ± .180 (7/7)	.243 ± .214 (5/7)	.171 ± .070 (7/7)	.193 ± .164 (6/7)	.314 ± .241 (6/7)
After BCN	.186 ± .157 (6/7)	.507 ± .117 (7/7)	.479 ± .211 (7/7)	.171 ± .070 (5/7)	.229 ± .111 (7/7)	.450 ± .173 (7/7)
S						
Before BCN	.100 ± .129 (3/7)	.271 ± .242 (5/7)	.243 ± .214 (5/7)	.171 ± .221 (4/7)	.243 ± .127 (7/7)	.286 ± .248 (7/7)
After BCN	.129 ± .095 (3/7)	.279 ± .184 (6/7)	.286 ± .245 (6/7)	.271 ± .188 (7/7)	.179 ± .086 (7/7)	.250 ± .191 (5/7)
T						
Before BCN	.086 ± .024 1-**	.100 ± 0	.100 ± 0	.071 ± .028	.093 ± .020	.100 ± 0
After BCN	.086 ± .024 1-**	.114 ± .037 1-**	.114 ± .037 2-**	.100 ± 0	.093 ± .020	.093 ± .020

*Electrocardiograms were made 1 hour after BCN administration. **Denotes the number of inverted T waves. ( ) Denotes the number in group showing characteristic; absence means that all in the group had the characteristic. Values are ± standard deviation, and no significant differences ($p > .05$) were noted.

TABLE 3—Observations of Cows Given Bulbocapnine (BCN) Intravenously

Animal	BCN dose/lb.	Pulse rate*			Respiration rate*			Ruminal contractions per minute*			State of catalepsy*		
		before	15 min.	1 hr.	before	15 min.	1 hr.	before	15 min.	1 hr.	before	15 min.	1 hr.
1) Grade Jersey, 750 lb., 7 yr. old, "docile"	0.25 mg.	44	80	64	16	15	16	4	2	3	None	None	None
2) Grade Angus, 1,200 lb., 6 yr. old, "docile"	0.50 mg.	50	80	68	14	16	12	2	3	3	None	None**	None**
3) Grade Angus, 1,090 lb., 6 yr. old, "would kick"	0.75 mg.	64	68	80	18	16	16	1	1	1	None	Slight** (would kick but took more provocation)	None
4) Grade Guernsey, 540 lb., 2 yr. old, "nervous"	1.25 mg.	100	72	76	20	18	20	2	2	2	None	Mod.**	Mod.
5) Grade Holstein-Friesian, 1,150 lb., 4 yr. old, "docile"	2.0 mg.	60	68	72	18	17	21	3	2	2	None	Mod.**	Mod.

Cows 3, 4, and 5 allowed rectal palpations at 1 hour without the usual struggle. Effects were apparent in 5 to 10 minutes. All cows were in stanchions during the observation period.

*Observations were made immediately before BCN injection, and 15 minutes and 1 hour after. **Salivation slightly in excess of normal.

compounds are not competitive, and that the site of action of BCN is not similar to that of morphine.

Cattle.—Studies in cattle, with increasing intravenous doses of BCN indicated no untoward effects on body function, although the pulse rate was usually moderately increased (table 3).

A group of 12 Hereford heifers was brought in from the range and handled very little prior to trial. At different times, observers (not informed of which heifers had been given injections) were able to identify 4 of 4 heifers given BCN, 2 mg./lb. body weight subcutaneously, 1 hour before, 3 of 3 given 1 mg./lb., and 1 of 2 given 0.5 mg./lb. The onset of signs was approximately 15 minutes after injection and the treated heifers appeared more lethargic than the controls. When the 2 mg./lb. dose was used, the heifers could be caught and managed with ease; whereas, the controls were generally difficult to handle. The treated heifers would recline or could be manipulated into the reclining position. When the heifers were in the latter position, they could be rolled over without difficulty. The effect at this dose level lasted about 2 hours. No untoward effects were observed in heifers given the BCN subcutaneously, but when 2 mg./lb. was given to 1 heifer intravenously, a transitory unsteadiness, dyspnea, and trembling resulted for about 2 minutes. Then, the heifer rapidly entered a cataleptoid state without difficulties.

A group of clinicians (unaware which heifers had been given injections) dehorned these heifers at 1½ to 2 hours following the subcutaneous injection of 2 mg./lb. of body weight of BCN. They were able to select all 9 heifers given BCN from the group of 12. The treated heifers were restrained more easily with the conventional techniques, struggled less during surgery, and appeared to hemorrhage less, probably because of the decreased struggling movements. Some degree of analgesia appeared to be present.

Discussion

The effects of BCN in cats were similar to those reported previously,[1] and the behavior in cattle was similar to that in horses.[2]

The uses of BCN in veterinary practice are restricted to the field of restraint for minor operative procedures. Its use may be extended to prevent straining such as occurs with uterine or rectal prolapses. In therapeutic doses, the effects on essential body functions are minimal, and do not appear to be hazardous in use. Bulbocapnine differs in action from the tranquilizers in that the drug visibly affects animals of all temperaments in producing a cataleptoid state, and apparently acts on the brain

centers in a more profound manner than do tranquilizers.

Summary

Bulbocapnine injected subcutaneously at the rate of 15 mg./kg. of body weight produced a state of catalepsy lasting for approximately 2 hours in cats, and 2 mg./lb. induced chemical restraint in cattle for a similar length of time. Few effects were observed on essential body functions in either species except for an increased pulse rate. Bulbocapnine may be useful in chemical restraint in these species.

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Heavy Parasitic Infection in an Egyptian Cobra—A Case Report

At necropsy on April 1, 1958, a 4-ft. female Egyptian cobra (*Naia haje*), at the Lincoln Park Zoological Gardens in Chicago, was found to have heavy infection by 3 nematode species and a pentastomid species. The cobra had been in the Gardens for a year, having been received on April 9, 1957. Its age was not known.

A nematode egg count of 4,000 was made from a 4-Gm. sample of preserved fecal material, using the sugar flotation method. The nematodes were identified as: *Polydelphus najae* (Mosgovoy, 1951), *Hexametra quadricornis*, and *Kalicephalus parvus* Maplestone.

Three adults of the pentastomic *Armillifer annulatus* (Baird, 1853) were recovered from the lungs.

Because of the scarcity of fecal samples, none of the parasite eggs were found prior to necropsy—*Benedict J. Jaskoski, Ph.D., associate professor, Department of Biological Sciences, Loyola University, Chicago, Ill.*

The author thanks Mrs. M. B. Chitwood, USDA, ARS, Beltsville, Md., for identification of the parasites.

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Fetal Mummification in Cattle

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IN A POPULAR farm publication, the following statements recently appeared: "Our present concept of the underlying cause of mummified fetus is the presence of excessive lethal characters in one of the parents. The likelihood of mummified fetus is believed to be much greater when both parents are carriers of the recessive genes."[19] Such statements tend to sabotage research efforts because they encourage the livestock breeder to conceal the fact that the condition exists in his herd and thereby make herd studies of the problem difficult. It may be that genetics are involved in fetal mummification, but scientific evidence to support such a belief appears to be inconclusive.

Review of Literature

The earliest contemporary report on fetal mummification was published in 1897.[2] This report described the condition, in 1894, in a cow in a herd in which epizootic abortion had prevailed for years. Although brucellosis was the disease being studied in this report, it was not concluded that Brucella organisms were the cause of the abortions; instead, the condition was ascribed to other circumstances.

In 1927, 2 cases of mummified fetuses in cattle were reported,[17] but evidence for heritability was not strong.

In a 1927 report[8] on inherited defects in livestock, investigation did not mention fetal mummification or ascribe its cause to a genetic origin.

In 1930, a Danish veterinary student reported[12] on lethal genes in Red Danish milk cows. Since that time, several articles have appeared incriminating genetic factors as the cause of fetal mummification; ironically, they all cite the Danish report as supporting evidence. The term "mummification" was mentioned only once in this report and then in reference to the dryness of the bone marrow of fetuses dead at term, with stiffened legs, shortened necks, and prominent joints.[17] The Danish worker was not discussing fetal mummification, but rather muscle contracture and ankylosis of fetuses that died at the eighth and ninth months of the gestation period.

In 1944, a list of lethal and sublethal characters in farm animals was tabulated, including fetal mummification.[11] The only supporting evidence for genetic causes was a reference to the Danish work.

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In 1947, other authors, in a discussion of genetics in cattle, referred to the Danish work; however, they stated that fetal mummification might possibly be allied to muscle contracture and that it was inherited as a recessive character. Any basis for their conclusions was not suggested.[15]

In another 1947 report,[10] the problem was considered common, affecting about 5 per cent of breeding females. It was suggested that a hormonal disturbance or a disruption in the blood supply to the fetus had been possible causes. In addition, the suggestion was made that cow families were involved and that transmission occurred only in females. This latter suggestion was also made without facts or figures as evidence.

In 1949, in a review[9] of inheritance in reproductive efficiency, the Danish work was again cited.

In 1953, 100 cases of fetal mummification were reported. Age of the dam was not considered significant. Recurrence of the condition on the same farm was not uncommon (in at least 26% of the cases) and on one farm as many as 8 cases occurred in 11 dairy cows. One cow delivered a mummified fetus along with a normal twin. The condition commonly occurred at 5 to 6 months of gestation. Several possible causes were suggested.[16]

A discussion of fetal mummification appeared in *Veterinary Record* in 1954.[13] In it a correspondent reported the condition in a herd of 100 cows where 7 had given birth to mummified fetuses during 18 months. In reply to the report, the editor stated that mummified fetuses occur sporadically in all breeds of cattle, but that the cause is unkown, and that it is not associated with any specific infection, but that there is some suspicion that it may be associated with inherited abnormalities. The editor also said that a large number of mummified fetuses in a herd is uncommon and it seems likely that those reported, and the concurrent abortion and infertility in the herd, may have a common cause.

In 1957, an attempt was made to estimate heritability of mummified fetuses over a period of 30 years in a herd of 2,607 cows in which 30 mummified fetuses produced by 29 cows and 19 sires were observed. The purpose of this study was to determine whether cows producing mummified fetuses had a higher incidence of daughters producing mumified fetuses than did cows observed and known not to have produced them. It was concluded that mummified fetuses are not transmitted as a single recessive in a simple Mendelian way. Lack of evidence for a genetic mechanism was understandable because mummified fetuses are due to "either resorption or abortion failure." Other possible causes

were suggested such as a pathologic condition of the uterus at the time of fetal death, age of fetus, torsion of uterus, and the functional state of the corpus luteum.[6]

The annual report of the New Zealand Dairy Board (1958) on the status of artificial breeding in that country mentions 13 cases of mummified fetuses for 1957, or 0.019 per cent of all calves. It was inferred that disease was a probable cause rather than heredity.[1]

In 1958, 23 cases during 4 years were reported. The cause was considered obscure and without evidence of any unusual genital disease. Nothing was found to suggest any obvious genetic association.[7]

In 1959, a total of 23 mummified fetuses recorded in 1,509 pregnancies in 504 cows were studied. Interpretation of the data at hand indicated that fetal mummification was not due to a homozygous autosomal recessive gene, but that it might be due to a sex-linked recessive lethal gene.[5] This assertion is dependent on all mummified fetuses being male — which is not the case.

It would appear that, to date, the theory which gives serious consideration to a recessive lethal character as a cause of fetal mummification is without published scientific evidence. The theory is quoted by authors who appear often to be quoting one another. This last statement is also characteristic of the replies received by the author in personal communications on this matter.

The author has first-hand knowledge of 30 mummified fetuses, the breeding history of the sires and dams involved, and their family pedigrees for several generations. During the past 2 years, efforts to enlist competent aid to evaluate this data have been unsuccessful.

Treatment and Control

The mummified fetus commonly has died after 4 to 6 months of gestation, but due to failure of estrus and the persistence of the corpus luteum it is not suspected until late in the gestation period, or after it is past, when normal development of the fetus, body changes incident to parturition, and calving fail to occur. For years, it has been known that removal of the corpus luteum of pregnancy is a satisfactory and safe method of inducing expulsion of the mummified fetus. Prior to parturition, the corpus luteum usually projects above the surface of the ovary and is easily enucleated.

Hormonal therapy is a preferred method of many to induce expulsion of the mummified fetus. The administration of 50 to 80 mg. of stilbestrol or 5 to 8 mg. of estradiol intramuscularly will expel 80 per cent of these fetuses in 36 to 72 hours and the administration may be repeated at 48-hour intervals if deemed necessary.[14] However, my experience with repeated estrogen therapy in treating this condition has resulted in nymphomania in several cows.

A cow treated to expel a mummified fetus should be observed carefully for the first few days following treatment and examined at the first sign of straining, because assistance may be necessary. Recovery following expulsion is prompt and fertility usually is unimpaired. Estrus frequently accompanies expulsion or occurs within a few days. Successful breeding of cattle is possible at this estrous period, but it seems advisable to defer breeding until the next estrus.

If the mummified fetus remains in the cow beyond the normal gestation period, efforts to expel the fetus by bringing the cow into estrus and breeding her are often fruitless. Here the problem may be related to a deeply embedded corpus luteum which is difficult to dislodge in its entirety.

To minimize the economic losses associated with the condition, early diagnosis is important. If fetal mummification is diagnosed before dry-off time, the dairyman can forego the cost of feeding the affected cow during her dry period. If the cow is still milking profitably, expulsion of the mummified fetus may be induced and the cow salvaged for future calf production. In any event, early diagnosis can be financially profitable to the dairyman and in most instances deserving of veterinary intervention.

Cows should be examined at the sixth to seventh month of gestation for presence of a viable fetus. Verification is made by palpating the middle uterine artery for a strong pulse (fremitus) indicative of the presence of a live calf. A mummified fetus, pyometra, or a neoplasm of the uterus will not give the same full arterial pluse of pregnancy. It is usually a simple task to expel the fetus at 6 to 7 months, just prior to the usual dry-off time, since mummification most frequently begins with the death of the fetus at 3 to 6 months of the gestation period.

Discussion

Extensive discussions of mummified fetuses are found in various texts and reports.[3,4,14,18]

By reviewing the literature and showing that evidence is lacking to incriminate

heredity as a cause of fetal mummification, I hope to help to remove a stigma placed on the breeder of purebred cattle whose animals may have produced mummified fetuses.

During 4 years, I have detected 30 mummified fetuses. They were produced by animals above average in conformation and milk production. The same dams produced 80 healthy calves during their lifetime, and 50 per cent of them have had 1 or more healthy calves since the expulsion of a mummified fetus. Nothing in my experience suggests that fetal mummification can be propagated by continued breeding of an animal that has had a mummified fetus.

Summary

Mummified fetus in the dairy cow is not uncommon. The exact cause of the condition is not known. Although most dairymen have had little or no experience with the condition, others have found it to occur frequently in their herds. Attempts to link heredity with fetal mummification may have diminished our opportunities of understanding the problem of fetal mummification by placing a stigma on the cattle breeder who has this problem. Consequently, he is reluctant to admit that his cattle are affected, and study of the problem is made more difficult. To date, any reference that links heredity and fetal mummification appears to be without published scientific foundation.

Fetal mummification is rarely diagnosed except when animals have completed a gestation period without showing any of the normal signs of calving. For that reason, a proposal is made that early diagnosis and subsequent removal of the fetus be accomplished while the cows are still producing milk. Such action would be economical to the dairyman.

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Feline Hip Dysplasia

Feline hip dysplasia has been diagnosed in a family of 14 inbred Siamese cats. Clinical signs were absent. The condition was discovered when 1 cat was radiographed for a possible pelvic fracture. Because the radiograph revealed hip dysplasia, all available relatives of this cat were radiographed; 14 of 15 were found to be affected—*S. R. Monroe, Jr., D.V.M., East Gadsden, Ala., at June, 1960, meeting of Northeast Alabama V.M.A.*

Use of Dihydrotachysterol

in the Prophylaxis and Treatment of

Hypocalcemia in Dairy Cows

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RELAPSES of cows with parturient paresis (milk fever) are troublesome to many veterinarians and an economic problem to the dairyman. Veterinarians have been anxious to find a solution, not only to the problem of relapses, but also to the problem of hypocalcemia in cattle known to be susceptible.

Workers[4,6] have theorized that parturient paresis in cattle results from a failure of homeostatic factors, principally in the parathyroid glands, that normally operate to maintain blood calcium at a constant level even with the tendency toward a drain of calcium depletion that occurs at the initiation of lactation. This temporary homeostatic failure or exhaustion of the parathyroid glands in cattle results in the syndrome of parturient paresis with signs similar to hypoparathyroidism in man.[13]

It was suggested in 1955[3] and again in 1956[3] that dihydrotachysterol* might prevent the majority of these relapses. This drug is produced by irradiating ergosterin to obtain tachysterin, which is then converted chemically to dihydrotachysterol. Literature on dihydrotachysterol first appeared in Germany in 1933, but the product was not available in the United States until about 1938. Vitamin D and dihydrotachysterol[1,2,13,14] increase calcium absorption from the gastrointestinal tract, mobilize calcium stored in the skeleton, and increase urinary phosphorus excretion.

It has been pointed out that the ratio of the effect on phosphorus excretion to that on calcium absorption is greater with dihydrotachysterol than with vitamin D.[1] It has also been suggested[11,14] that vitamin D and dihydrotachysterol in the treatment of hypoparathyroid patients may have a direct effect on the renal tubular reabsorption of calcium, resulting in hypercalciuria in the presence of hypocalcemia.

The ambulatory clinic at the University of California had been using dihydrotachysterol in an effort to prevent parturient paresis relapses. The studies reported here were made when favorable results were not forthcoming.

Materials and Methods

Breeds of cows used were Holstein-Friesian (38%), Jersey (37%), Ayrshire (13%), Guernsey (6%), Milking Shorthorn (4%), and Brown Swiss (1%). The diagnosis of hypocalcemia (parturient paresis) based on history, clinical signs, and response to therapy, was confirmed by laboratory techniques in a number of cases. The drugs used for prophylaxis and treatment were dihydrotachysterol, vitamin D, and calcium gluconate. Dihydrotachysterol was stored within the temperature range recommended by the manufacturer.

Sixty cows with parturient paresis were treated intravenously with 500 ml. of 20 per cent calcium gluconate and served as controls. Forty cows were treated with 10 mg. of dihydrotachysterol intramuscularly in addition to 500 ml. of 20 per cent calcium gluconate intravenously. Thirteen cows with records of parturient paresis were treated prophylactically with 10 mg. of dihydrotachysterol intramuscularly shortly before (24 hours or less), at, or soon after (1 to 6 hours) parturition. Blood was taken at the time of treatment for serum calcium determination. Five cows received 2 million units of vitamin D intramuscularly in addition to 10 mg. of dihydrotachysterol, as recommended in human medical practice[14] for the treatment of hypocalcemias shortly before, at, or soon after parturition. Blood samples were also drawn from these cows for serum calcium determinations.

In a number of cases, serum magnesium and serum phosphorus levels were determined in addition to serum calcium levels. Clark and Collip's method[5] was used for serum calcium determination. Denis' method, modified by Hawk, Oser, and Summerson,[10]

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*Antitetanisches Praeparat No. 10 or A.T. 10, available in the United States as Parterol from the S. E. Massengill Co., Bristol, Tenn.

TABLE 1—Results of Treatment and the Serum Calcium Levels of Dairy Cows with Parturient Paresis

	No. cows	No. relapses	Ca* at time of prophylactic treatment	Ca* at time of clinical signs of parturient paresis	Ca* at time of relapses
Treated with Ca-gluconate only	60	11	....	4.98 (3.8-7.0)	4.47 (4.0-5.0)
Treated with Ca-gluconate and dihydrotachysterol	40	7	....	4.62 (2.0-7.0)	4.42 (3.0-6.0)
		No. of subsequent cases of parturient paresis			
Treated prophylactically with dihydrotachysterol	13	8	8.2 (6.0-9.5)	3.9 (2.5-5.0)	4.2** (4.0-4.5)
Treated with dihydrotachysterol and vitamin D prophylactically	5	3	9.3 (9.0-9.5)	3.6 (2.5-5.0)	5.0†

*Blood serum calcium level in mg./100 cc.; **3 cows; †2 cows.

was used for serum magnesium levels, and Fiske and Subbarow's method[2] for serum phosphorus levels.

Clinical Data and Laboratory Findings

The histories were typical for parturient paresis. Either the cows were unable to rise, or they started to stagger as soon as they stood. Shortly before, they had no signs of illness. Incidence in relation to parturition among 85 cows was: 5 per cent developed clinical signs before parturition; 8 per cent, at the time of parturition; 12 per cent, within 12 hours postpartum; 61 per cent, 12 to 48 hours postpartum; 10 per cent, 3 to 7 days postpartum; and only 4 per cent, more than a week postpartum.

Average body temperature was 100.1 F., maximum was 104.8 (this particular cow had been lying in the sun for several hours), and minimum was 94.0 F. A more detailed body temperature classification is: 34 per cent had 100.0 F. and lower; 27 per cent, 100.1 F. to 101.0 F.; 33 per cent, 101.1 F. to 102.5 F.; and 6 per cent, 102.5 F. and higher. Average pulse rate was slightly accelerated (82 per minute), ranging from 40 to 144 per minute.

The rate of respiration showed tremendous differences; the average was 31 per minute, with a range of 15 to 86 per minute. Rumination was normal in 21 per cent, slighty decreased in 33 per cent, and absent in 46 per cent of the cows examined. Blood serum calcium levels averaged 4.57 mg./100 cc. and ranged from 2.0 mg./100 cc. to 7.0 mg./100 cc. Average serum phosphorus was 3.04 mg./100 cc. (1.10 mg./100 cc. to 6.0 mg./100 cc.), and average serum magnesium was 2.97 mg./100 cc. (2.00 mg./100 cc. to 4.30 mg./100 cc.).

Results

Eleven (18%) of the 60 cows treated with calcium gluconate alone had relapses, 10 within the first 30 hours and 1, 72 hours after treatment. There were 7 (17%) relapses among the 40 cows treated with dihydrotachysterol and calcium gluconate, all occurring 12 to 36 hours after the treatment. Eight (61%) of the 13 cows given dihydrotachysterol developed hypocalcemia 8 to 60 hours after treatment. Among the 5 cows treated prophylactically with dihydrotachysterol and vitamin D, 3 subsequently had parturient paresis. A number of cows that had no clinical signs of parturient paresis were checked for several days after treatment with dihydrotachysterol and failed to demonstrate a steady rise of the serum calcium levels (table 1, 2). One cow (33, table 2), which was treated prophylactically 8 hours before parturition, developed parturient paresis at parturition, and was given calcium gluconate plus a second dose of dihydrotachysterol. Further relapses occurred 18, 42, and 52 hours later, on which occasions she was treated with calcium gluconate only.

TABLE 2—Serum Calcium and Serum Phosphorus Levels (Determined at Treatment and on Following Days) in 3 Normal Cows and 2 Cows with Parturient Paresis Treated before, at, or soon after Parturition with Dihydrotachysterol

Cow (No.)		8 hours antepartum	At or shortly after parturition	Hours postpartum			
				24	48	72	96
18	Ca*	....	7.5†	9.5	8.0	8.5	9.5
	P**	....	3.7	4.0	3.0	4.2	4.9
392	Ca	....	8.5†	9.0	10.0	10.5	10.0
	P	....	4.3	5.1	4.6	5.6	....
39	Ca	....	7.5†	8.5	9.0	8.0	9.5
	P	....	4.6	4.2	4.6	4.6	4.4
14	Ca	....	9.0†	3.5‡(1)	5.0‡	5.5	....
	P	....	....	1.5	....	....	....
33	Ca	7.0††	4.0‡†	4.0‡(2)	4.0‡(3)	4.5‡(4)	....
	P	2.3	3.0	....	....	3.0	....

Ca*—serum calcium in mg./100 cc.; P**—serum phosphorus in mg./100cc.; †treated with 10 mg. dihydrotachysterol intramuscularly; ‡—treated with 500 ml. of 20 per cent calcium gluconate solution intravenously after showing signs of parturient paresis; (1)—14 hours postpartum, (2)—18 hours postpartum, (3)—42 hours postpartum, (4)—52 hours postpartum.

Discussion

Comparison of the results of treatment with calcium gluconate alone and with dihydrotachysterol and calcium gluconate together shows no significant difference in percentage of relapses (18% and 17%). Relapses occurred at least 12 hours after initial treatment, by which time the effect of dihydrotachysterol should have been evident. A positive Sulkowitch test at this time would be meaningless because a hypercalciuria may be caused by the direct effect of dihydrotachysterol on renal tubular reabsorption, even in the presence of hypocalcemia.[14]

We were also unable to demonstrate a definite prophylactic effect of dihydrotachysterol, with or without vitamin D, in cows with a known history of parturient paresis. Eight of 13 cows treated with dihydrotachysterol and 3 of 5 cows treated with dihydrotachysterol plus vitamin D developed parturient paresis within a day of calving.

Previous work from this school[15] shows a slightly lower proportion of protein-bound calcium to total calcium in cows with parturient paresis and may indicate that the parathyroid hormone is not the only mechanism operating in hypocalcemia in cows. It has been reported that "there is a fundamental or basic mechanism of calcium homeostasis upon which the parathyroid hormone acts. Like other glandular secretions the parathyroid hormone does not initiate a biologic process but only plays upon it by speeding or slowing the activity over a fundamental pathway."[12]

These findings and statements resemble closely data from investigators[14] indicating that in human patients there is no abnormal proportion of diffusible to nondiffusible calcium in hypo- or hyperparathyroidism.

More evidence in this direction is given by a report which states that diseases of the parathyroid glands and of calcium and phosphorus metabolism might be related to a part of the tricarboxylic-acid cycle, *i.e.*, citric acid.[2]

A report on 328 cases of parturient paresis in dairy cows treated with calcium gluconate intravenously and dihydrotachysterol intramuscularly, showed only 7 incidences of relapse, a rate of 0.0213 per cent** as opposed to a previous average of 22.8 per cent. In our investigation, however, treatment with calcium gluconate intravenously or calcium gluconate intravenously plus dihydrotachysterol intramuscularly yielded no significant difference in the number of relapses, nor did dihydrotachysterol prevent relapses in cows known to be prone to parturient paresis.

Summary

Relapses occurred in 11 of 60 cows with parturient paresis that were treated with

**On the basis of the figures supplied in the article, this figure should read 2.13 per cent.

calcium gluconate intravenously and in 7 of 40 cows given dihydrotachysterol intramuscularly in addition to calcium gluconate. Dihydrotachysterol alone failed to prevent parturient paresis in 8 of 13 cows with a previous history of hypocalcemia, and dihydrotachysterol along with vitamin D had no significant effect as a prophylactic measure in 5 other parturient paresis-prone cows.

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Arsenicals Have Limited Value for Dairy Calves

Arsenicals continue to periodically interest investigators working with ruminants, in spite of the preponderance of evidence that indicates that they have little effect on feed conversion or gains. Certain early work indicated that arsenicals were beneficial in reducing diarrhea and improving general development in dairy calves, but later work does not confirm these observations in most cases.

Undoubtedly, some variability in results has been due to "stress" in experimental animals, since it is well-known that arsenicals give their best improvement when used in "stress" situations. Using supplemental arsanilic acid, some workers have found no improvement in gains or in feed conversion. However, they did find that use of this additive seemed to lower transit shrinkage and appeared to help combat "stress."—*Feedstuffs, 32, (May 28, 1960): 42.*

Genital Effects of

Diethylstilbestrol in Spayed Heifers

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WHILE SPAYING heifers has been accepted as an unprofitable procedure, experiments with such heifers are still reported periodically in both scientific and popular agricultural journals.[1,3,9] These investigations appear to be necessary to keep cattlemen convinced that the surgical operation is economically unsound except under unusual circumstances. Also, some of these investigations yield technical information not obtainable with intact animals.[4,5]

Since nonovarian estrogens are of little importance in the open cow,[2] ovariectomy followed by a supply of exogenous estrogen theoretically should be a satisfactory physiologic substitute for the ovaries in feeder heifers. The absence of estrus and possible pregnancy would be advantageous to beef producers. In practice, neither diethylstilbestrol (DES) nor any other estrogen has made the performance of spayed feedlot heifers superior to, or even equal to, that of intact ones given a similar treatment.[1,8] In experiments with DES in spayed heifers, little attention has been given to the changes in the genitalia, whereas rate of gain and feed efficiency have been considered in detail.

This experiment was designed to study the effects of DES on the genital organs of ovariectomized heifers and to determine if such effects are manifested uniformly during the postimplantation period. Since spayed animals are more sensitive to estrogens than are sexually mature intact animals,[10] the exaggerated responses of the former should aid in detecting and evaluating changes due to DES in intact females. Currently, this hormone is not recommended for use with breeding stock, but there is little scientific work concerning the extent to which the drug would be injurious. The determination of those reproductive abnormalities due to DES and those due to other causes has been difficult.

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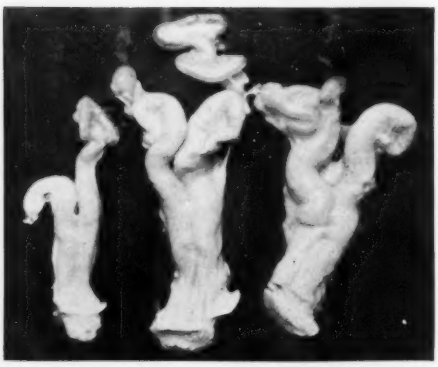

Fig. 1—Uterus from a nontreated heifer (left) and 2 uteri from treated heifers. Oviducts are greatly enlarged.

Materials and Methods

Twenty-seven Hereford heifers were weaned when 8 months old and spayed 10 days later through an incision in the paralumbar fossa. After allowing another 10 days for recovery from surgery, the heifers were randomly allotted to treatment groups (table 1), and DES was administered by the deposition of pellets subcutaneously

TABLE 1—Number of Heifers Given Diethylstilbestrol

Controls, no DES	18 mg. implant of DES	Time of slaughter*
3	6	5 weeks
3	6	10 weeks
3	6	15 weeks

*Time of slaughter after initiation of the experiment.

TABLE 2—Uterine Weights in Grams

	Control, no DES	18 mg. implant of DES	Time of slaughter
Range	21-32	60-100	5 weeks
average	21	83	
Range	26-29*	70-88	10 weeks
average	28	78	
Range	28-41	73-115	15 weeks
average	35	96	

*One uterus weighing 66 Gm. from an incompletely spayed heifer not included in these data.

TABLE 3—Average Teat Lengths in Centimeters

Control, no DES	18 mg. implant of DES	Time of slaughter
2.9	4.8	5 weeks
3.1	4.1	10 weeks
3.2	4.7	15 weeks

near the base of the convex surface of the right ear. A sufficient amount of growing-fattening diet was fed to produce a daily gain of about 1 lb. per animal. The heifers were slaughtered and their carcasses were salvaged for food at intervals after the beginning of the experiment (table 1). Estrogenic stimulation was evaluated by comparing anatomical changes in the heifers before and after slaughter.

Results and Discussion

The only visible aftereffect of surgery was stiffness for a few days in certain heifers. Probably, this was due to resistance to restraint during surgery rather than to peritonitis, because recovery occurred without treatment. At slaughter, blood clots in the process of being walled off and absorbed were found in the posterior sublumbar region of 3 heifers. These clots were about 4 inches in diameter and were indicative of the hemorrhage that followed removal of the ovary. No histologic sections were made of these lesions.

The uteri from the untreated heifers varied in weight from 21 to 41 Gm. with the exception of 1 uterus which weighed 66 Gm. The heifer from which this uterus came was incompletely spayed as evidenced by a fragment of ovarian tissue 1 cm. in diameter attached to the utero-ovarian ligament. The probability of incomplete spaying is higher in cattle than in some other species because the operation in cattle is done under local anesthesia rather than under general anesthesia which renders the patient immobile, and because the ovary is not visible prior to extirpation. Completeness of ovariectomy cannot be checked in cattle,[7] as it can in rodents by employing vaginal cytology.[6] As can be seen from the data (table 2), uterine weights of the control heifers remained fairly constant after spaying. The uterine weights of the treated heifers also remained rather constant through the experimental period, indicating fairly uniform stimulation from the implanted DES pellet.

Twelve oviducts were enlarged, with an accumulation of fluid in their lumina (fig. 1). The longest of the affected ducts was over 14 inches, which is almost 3 times the normal length. Eight of the enlargements occurred in treated heifers and 4 in nontreated heifers. Both oviducts were affected in 1 heifer (treated) only. Isolated ductal diverticula, of which there were many, were not counted. The relative diameter of abnormal ducts was increased much more than was the length. This

Fig. 2—Untreated heifer (left) and treated heifer with greater teat development due to DES treatment.

phenomenon did not occur in all of the heifers, nor was it limited to treated heifers; however, the increase in size was more prominent in the treated heifers than in the untreated ones, an indication that DES accentuated, rather than caused, the condition. Histologic sections revealed edema with increased glandular development in the affected oviducts. Probably the enlargements were due to injury from ovariectomy with subsequent closure of the ductal ends. Thereafter, any fluid secreted into the lumen by glands in the walls could not escape. As far as could be determined, the anatomical abnormality had no physiologic effect on the heifers. To eliminate the possibility of enlarged oviducts after spaying, one could attempt either to remove the entire oviduct or to leave it intact.

The differences in teat development between treated and nontreated heifers were marked (fig. 2). The teat lengths (table 3) varied directly with teat diameter, teat hyperemia, and udder size.

An attempt was made to separate the parenchymal mammary tissue from the mammary fat (table 4). The task became more difficult as the heifers grew older because of a greater intermingling of the 2 types of tissue. The udder weights of the treated heifers tended to vary directly as the length of treatment, whereas those of the nontreated heifers tended to vary indirectly with the time interval after spaying. None of the control heifers had milk in the teat cistern (lactiferous sinus), whereas 2, 3, and 5 of the treated animals slaughtered at 5, 10, and 15 weeks, respectively, had milk. The presence of milk in virgin heifers has not been commonly reported as a side effect of DES usage in animal nutrition, although small amounts might easily escape detection.

TABLE 4—Average Mammary Weights in Grams

	Control, no DES	18 mg. implant of DES	Time of slaughter
Range	990-1,640	1,006-1,996	5 weeks
average	1,337	1,479	
Range	1,406-1,575	1,276-1,868	10 weeks
average	1,500	1,508	
Range	900-1,000	950-2,000	15 weeks
average	950	1,541	

Edema of the external genitalia (labia vulvae) was marked within 3 weeks after the beginning of the experiment (fig. 3). This phenomenon seemed to be due to an edema of the vulva and perineal region, as well as to a relaxation of pelvic ligaments, giving the treated heifers the appearance of being in estrus.

Fig. 3—Untreated heifer (left) and treated heifer with perineal edema due to DES treatment.

An effort was made to measure the lumbosacral angle and classify the heifers accordingly. This was discontinued because the treated heifers varied greatly within a few days, in regard to this angle and the height of the tailhead. Any conclusions that might have been made would have been subjective and debatable. The treated and control heifers could not be differentiated by using this criterion at any time without error.

Summary and Conclusions

Since ovarian hormones are important in the development and maintenance of the genital organs, one would suspect that the uterus, udder, and teats would shrink in size after ovariectomy.

In the 18 experimental heifers used in this investigation, the udders had some tendency to shrink, but the teats and uterus remained about the same size after ovariectomy, for the duration of the experiment. These anatomical structures were compared in spayed heifers allotted to 3 groups for slaughter at 5, 10, and 15 weeks after spaying.

The effects of diethylstilbestrol in spayed heifers were markedly increased uterine size, teat development, and edema of the perineal region. Because of these results in spayed heifers, particular attention should be given to the above-mentioned anatomical areas when the effects of DES are studied in intact heifers.

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Physalopteran Infection in an Orangutan

A MALE ORANGUTAN (*Pongo pygmaeus*) was found dead in his cage at the Lincoln Park Zoological Gardens in the early morning of Aug. 8, 1958. When found, he was in the normal sleeping position with a small piece of plaster clutched between the thumb and forefinger of the right hand.

Fig. 1—*Abbreviata causasica* nematodes from an orangutan.

Prior to death, the orangutan appeared to be in good physical condition, of normal weight and activity; His age was 8 years and 9 months. He had been received at the Gardens on Dec. 9, 1949, when he was 1 year old.

Necropsy on Aug. 12, 1958, revealed gross abnormality of the heart; the probable cause of death was heart failure.

There was heavy infection by *Abbreviata caucasica* von Linstow, 1902, a physalopteran nematode. The esophagus was impacted with the nematodes, and others were found in the trachea and stomach. A total of 276 worms were recovered (fig. 1). The stomach is the normal habitat of this parasite although other species of this genus have been reported from the esophagus and trachea. It is possible that migration of some worms occurred after death since the orangutan had died about 6 hours before removal from his cage.

Prior to death, examination of fecal samples of the host had not revealed the presence of infection. *Abbreviata caucasica* has been previously reported only from Africa, where it occurs in man and the monkey.

Arthropods serve as the intermediate hosts for this and other physalopteran nematodes although the life cycle of *A. caucasica* has not been fully elucidated.—*Benedict J. Jaskoski, Ph.D., associate professor, Department of Biological Sciences, Loyola University, Chicago, Ill.*

The author thanks Mrs. M. B. Chitwood, USDA, ARS, Beltsville, Md., for identification of the nematodes.

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Observations on the Treatment of

Fractures of the Long Bones

in Large Animals

R. L. LUNDVALL, D.V.M.

FRACTURES of the long or weight-supporting bones in large animals present unique problems in treatment. Because of their weight, ordinarily large animals must be able to stand to prevent the development of decubital ulcers on protuberances of the body and head. Also, to allow the digestive processes to proceed normally, most large animals must be able to remain in the standing position for certain periods of time daily. In man, and in small animals, this is not as serious a problem. Because of these factors, many types of devices and restraints have been attempted to achieve reduction of fractures and, at the same time, to allow limited use of the affected leg. Unfortunately, many of the methods attempted have been "borrowed" from methods used in man or in small animals, with considerable difficulty attending their use.

This report includes a review of methods of the treatment and of the clinical results obtained in 151 consecutive animals with fractures of the long bones presented for treatment at the clinic (College of Veterinary Medicine, Iowa State University). Only fractures of the weight-supporting long bones are discussed, with the exception of inclusion of the carpal and tarsal bones, since they function essentially as weight-bearing members. Fractures of the fibulae, second and fourth metacarpi and metatarsi, and of the sesamoids and patellae are excluded. A certain number of animals listed as destroyed (table 1, 2) were not treated, since no attempt at reduction was made; the owners merely wished to have the animal examined carefully and an opinion expressed concerning the chances of recovery, functional use if recovery was possible, and the cost of treatment before deciding to have the animals euthanatized. In the case of fractures in the bovine species, a few grade or feeder animals were presented for treatment, most of which were sent to slaughter by the owner without attempts at treatment. Also, a number of purebred cattle were sent to slaughter after examination, because of economic factors or because of a poor prognosis.

Good functional recovery indicates that the fracture healed with no marked distortion and with very little interference with motion; fair functional recovery indicates that the fracture healed with some distortion and/or limitation of motion, but that the animal was suitable for a pet or for breeding purposes without any special care. Poor functional recovery indicates considerable distortion, paralysis, limited motion of the leg, or, in some cases, amputation of the leg, although some animals proved to be of value as broodstock following amputation.

Certain observations made during review of these cases in regard to treatment and prognosis are not evident unless each case is reviewed in detail. Some animals were euthanatized, or died of a toxemia or septicemia as the result of necrosis of the leg distal to the site of the fracture. In most cases, this resulted from interruption of the blood supply to the distal portion either by compression or by severance of major vessels by the fractured ends of the bone. This was especially true of fractures of the metacarpus and metatarsus.

At the beginning of the observation period, most compound fractures were treated by reduction in a Thomas splint, or by a plaster-of-paris cast applied with a window cut into the cast over the site of the skin wound. Results with either method were not too favorable, and different techniques

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were attempted to increase the survival rate. Intramedullary pins and plating with stainless steel plates and screws were first tried in a limited number of experimental animals. They were found to be of value when applied to certain selected clinical cases. However, osteomyelitis, and difficulty in avoiding joint capsules in the insertion of the pins and screws, limited their use.

A reinforced plaster-of-paris cast applied over a compound fracture, and changed at intervals as exudate accumulated or as the cast became soft, was found to be the most satisfactory method used. A certain number of fractures of the femur were found to respond to stall rest, with no restraining device being used, although some distortion of the leg could be expected to result on healing. This was especially true in the case of fractures of the distal epiphysis of the femur in calves and colts. Finally, clinical results indicated that much better results were to be expected in treatment of immature animals than in mature ones, and that animals in the last half of pregnancy or in a stage of heavy lactation offered a poorer prognosis than nonpregnant and nonlactating animals.

Standardized Procedures

Through trial and error, several standardized procedures have been developed that are useful in the most commonly encountered types of fractures. Several of the methods require little, if any, specialized equipment or skilled help and, therefore, are applicable to field use; other techniques must necessarily be performed with hospital facilities. Thomas splints, plaster-of-paris casts, intramedullary pins, stainless steel plates and screws, through-and-through fixation pins with and without the concurrent use of a plaster-of-paris cast, and support of the animal with no attempt at reduction have all been used. It has been found that all of these techniques have some merit, but because of problems in application, aftercare, and certain mechanical problems, the more involved techniques are not satisfactory for routine use. It has also been observed that treatment of certain types of fractures is not economically or esthetically sound.

Thomas splints and certain modifications of them have been widely used in the treatment of fractures. However, results obtained in large animals have not been as satisfactory as those obtained in small animals because the necessity of making the

TABLE 1—Clinical Results of Fracture Treatment in Horses and Ponies

Location	Results as to functional use				
	Good	Fair	Poor	Euthanatized	Died
Phalanges					
Simple	5	5	..	..	..
Compound	..	..	..	3	2
Metatarsus					
Simple	8	2	1	..	..
Compound	6	..	1	3	2
Tarsus					
Simple	..	2	..	..	..
Compound	..	1	1	2	..
Tibia					
Simple	3	2	1	..	..
Compound	..	..	1	..	2
Femur					
Simple	..	3	1	3	..
Compound	..	1	..	..	..
Metacarpus					
Simple	5	1	..	..	1
Compound	2	..	..	4	2
Radius					
Simple	4	5	1	1	1
Compound	1	1	..	..	2
Ulna					
Simple	..	3	..	..	..
Humerus					
Simple	..	2	..	..	1
Scapula					
Simple	..	1	..	..	..
Totals	34	29	7	16	13

TABLE 2—Clinical Results of Fracture Treatment in Cattle

Location	Results as to functional use					
	Good	Fair	Poor	Euthanatized	Died	Slaughtered
Phalanges						
Simple	..	2	..	..	..	..
Compound	..	..	..	..	..	..
Metatarsus						
Simple	3	3	..	..	1	2
Compound	1	1	3*	1	..	..
Tibia						
Simple	..	7	..	..	2	3
Compound	..	..	..	..	3*	..
Femur						
Simple	..	..	1	4	..	1
Compound	..	..	1	..	..	..
Metacarpus						
Simple	6	1	..	..	2*	..
Compound	..	..	..	..	..	..
Radius						
Simple	1	1	..	..	..	..
Compound	..	..	..	..	..	..
Humerus						
Simple	1	..	..	..	..	..
Compound	..	..	..	..	1	..
Total	12	15	5	5	9	6

* Amputated.

TABLE 3—Type of Fracture Treatment Used in Horses

	Thomas splint	Thomas splint + plaster/paris	Plaster-of-paris cast	Stainless steel plates + plaster-of-paris	Intramedullary pins	Transfixion pins + plaster/paris	Supporting crate	No treatment
Phalanges	..	..	5	..	..	..	..	10
Metatarsus	..	1	15	3	..	..	..	4
Tarsus	..	..	1	..	..	..	1	4
Tibia	..	1	2	1	..	1	2	2
Femur	1	..	..	..	1	..	..	6
Metacarpus	..	..	12	2	..	..	..	1
Radius	3	1	6	..	..	2	..	4
Ulna	..	..	..	..	..	..	..	3
Humerus	..	..	..	..	..	1	1	2
Scapula	..	..	..	..	..	..	..	1
Totals	4	3	41	6	1	4	4	37

splint strong enough to support the animal's weight leads to mechanical difficulties in shaping the splint to the desired form. There are also problems in obtaining material of light enough weight that is malleable and yet sufficiently strong. Second, because of the amount of body weight that is borne by each leg, decubital ulcers commonly form at the junction of the leg and the trunk. A Thomas splint applied to the hind leg will also interfere with defecation and urination if it is not properly applied or adjusted. This splint has the further disadvantage, especially when applied to the hind leg, of extending the total length of the leg sufficiently so that the animal is unable to stand and walk easily, or to regain a standing attitude from a recumbant one. The Thomas splint has proved most useful in fractures in calves, and in fractures of the tarsus and tibia in horses when used as a supporting device with the concurrent use of a plaster-of-paris cast.

Intramedullary pins have been used in a few clinical cases, but primarily in experimental animals. From observations made upon these animals, wider use of the pins might be advisable. Certain technical difficulties concerning insertion, and the necessity of giving added support to the fractured member for some time after insertion of the pin(s), preclude widespread use. Osteomyelitis commonly follows insertion of an intramedullary pin, even with the most rigid aseptic techniques used at the time of insertion. It is possible that this is blood-borne in origin. It has also been necessary to open joint capsules to insert pins in certain locations, and this is usually regarded as undesirable. Since large animals will usually attempt to use the affected leg to support weight, the pins must be extremely strong and rigidly fixed in the medullary cavity, and added support by means of a plaster-of-paris cast or a Thomas splint is necessary. Jonas pins, although their use has been limited, show some advantage in that they may be inserted at the site of the fracture. However, additional support to the fractured leg is also necessary with their use.

Plating with stainless steel plates and screws has been used in a number of cases. Aseptic techniques and added support are necessary for good results. Plating has proved to be a fairly satisfactory method of handling certain types of fractures, especially transverse fractures with loss of bone substance. It has been observed that the plates and screws must usually be removed at the end of 5 or 6 weeks because the screws tend to loosen, apparently from an aseptic necrosis. After removal, it is necessary to support the leg in a cast for a further period of 4 to 10 weeks. Plating is not satisfactory in the presence of osteomyelitis. If the infection can be controlled within a few days, satisfactory results may be obtained. If the infection persists, sequestra formation, bone resorption, and loosening of the screws occurs within a relatively short time.

Through-and-through (transverse) pinning with stainless steel pins and external bars has been used in some experimental animals and in a limited number of clinical cases. It has been observed that the pins and bars by themselves are not sufficiently strong to support the animal, with few exceptions. A more satisfactory method is the simultaneous use of a plaster-of-paris cast enclosing the protruding portions of

TABLE 4—Type of Fracture Treatments Used in Cattle

	Thomas splint	Thomas splint + plaster cast	Plaster-of-Paris cast	Intramedullary pins	Amputation	No treatment
Phalanges	..	..	..	..	..	2
Metatarsus	1	..	10	..	3	..
Tibia	5	2	1	..	..	7
Femur	1	..	..	..	..	6
Metacarpus	..	..	6	..	2	1
Radius	1	..	1	..	..	..
Humerus	..	..	..	1	..	1
Totals	8	2	18	1	5	17

the pins, and the external bars. Some difficulty has been experienced with osteomyelitis, either present at the time of reduction or developing after the fixation pins have been placed. If this persists, delayed healing, and necrosis and resorption of bone surrounding the pins, prevent proper immobilization and callus formation may not occur.

Support of the animal in various types of slings has been employed in the treatment of fractures of the long bones, especially those of the radius, tibia, and femur. External and internal fixation has been employed concurrently in some cases. The usual type of sling is not satisfactory in most cases. The animal supported in the sling will often attempt to walk, and either slide partially or completely out of the sling, or twist the sling and the supporting chains or ropes until its entire weight is borne by the sling. When the animal's entire weight is borne by the sling, decubital ulcers form, or respiratory and digestive difficulties may occur. A more satisfactory support may be made by constructing a crate sufficiently large to enclose the animal, narrow enough to prevent turning, and strong enough to support the animal's weight. A padded bar is placed behind the animal so that it may lean or "sit" upon this for rest and support. A heavy canvas sling is placed under the animal's body, but not touching it. When the animal decides to rest, it will usually lean into the bar behind it, or slump down into the body sling for short periods of time.

Plaster-of-paris casts, made of commercially available plaster-of-Paris impregnated bandage and reinforced with metal bars, have been found to be the most satisfactory reduction devices, both from the standpoint of results and that of ease of application. Certain principles in application must be followed for satisfactory results. Primarily, the cast must be absolutely form-fitting, with no pressure points. To achieve this, it is best not to use padding to any extent. Single or double layers of orthopedic stockinet, or a single layer of orthopedic felt is sufficient padding for use under this type of cast. The hair of the leg is not clipped, to furnish further protection; in the case of compound fractures, only the immediate area around the skin wound is clipped to allow proper cleansing and debridement. Sulfanilamide powder, applied rather thickly to the hair and rubbed into the skin, has been proved to control most superficial bacterial infections. Further padding of protuberances, such as the carpus, tarsus, and fetlock, with additional layers of soft materials is unnecessary and usually it results in more difficulties in maintaining an even pressure and in keeping the fracture reduced.

Compound fractures present some problems when plaster-of-paris casts are used, since infections of the soft tissues and of the bone itself are usually present. However, windows cut into the cast to allow drainage and dressing of the skin wounds are not advisable in most cases, because edema of the soft tissues results from lesser pressure at the windows, and this is followed by exuberant granulation and necrosis. In addition, the windows tend to weaken the cast at critical points.

A considerable amount of exudation is to be expected at sites of skin wounds in compound fractures. This is ordinarily of little consequence, provided that the wounds have been carefully cleansed prior to applying the cast and that appropriate antibiotic or sulfonamide therapy is instituted. The cast must be removed and replaced at intervals because the cast softens from the exudate as it collects under the cast. However, several casts have been placed over compound, comminuted, infected fractures and allowed to remain in place for periods of up to 7 weeks without serious, adverse results. Some skin necrosis can be expected to occur under the exudate, but again it is of no consequence provided general symptoms of septicemia or toxemia do not develop. The body temperature and local heat over the site of the fracture seem to be fairly reliable guides to the necessity of removal of the cast and replacement.

Healing is usually considerably slower following a compound fracture than in the case of a simple fracture. Also, major nerve and blood supplies are more apt to be interrupted, leading to necrosis of the leg distal to the site of the fracture.

The plaster cast should extend from below the coronary band to a point preferably including the joint above the site of the fracture. If the cast does not extend down over the hoof wall, edema of the skin and subcutaneous tissues, followed by necrosis, will rapidly occur below the lower limits of the cast. Usually, it is preferable to carry the cast quite high on the leg to

add support to the whole leg. It is not always possible to include the joint above the site of the fracture, especially in fractures of the radius, tibia, and the femur. In such cases, additional supporting devices such as a padded crate or a modified Thomas splint are often necessary.

The plaster cast should be especially thick at the carpus and tarsus, and for some distance above and below these areas, as most strain is placed on the cast at these points. The usual reinforcement used, and probably the most satisfactory because of its tensile strength and light weight, is duraluminum bar stock, ¼ by 1 inch. Two reinforcing bars are usually used on the front leg, 1 lateral and 1 medial. On the hind leg, 3 bars are used, 1 medial, 1 lateral, and 1 posterior. The bars should be long enough to extend from the ground surface to the top of the cast. The inner layer of the form-fitting cast is applied, and when it has hardened sufficiently so that finger pressure does not depress it, the shaped bars are placed in position, and additional plaster-of-paris impregnated bandage is applied to bind the bars firmly in position.

Plaster casts are often split to check healing, or to be used as temporary splints once the healing process has proceeded past the soft callus stage. It is necessary to assure that the split cast be reapplied to the leg, exactly as before, and in such a way that no separation of the halves of the cast occurs. If the split cast does not conform exactly to the contours of the leg, or if a space is left between the halves, edema and skin necrosis are apt to occur.

The length of time a cast or other restraining device should be left in place will vary considerably. Fractures in young animals heal much more rapidly than in adult animals. Colts and calves several months old may develop a firm callus formation in as little as 3 weeks, in cases of simple fractures or epiphyseal separations. On the other hand, it is not uncommon to keep a cast on an aged animal for 8 to 10 weeks, even in the case of a simple fracture, and then follow this with a splinting device of some kind for another 4 or 5 weeks. Comminuted fractures take somewhat longer to heal, and compound fractures commonly require a minimum of 8 weeks to form a firm callus. Plating and fixation with internal or external pins slow down callus formation to a considerable extent. The general condition of the animal has some influence upon healing. Bonemeal or other properly balanced calcium and phosphorus supplements are thought to be indicated during the repair process.

With few exceptions, prognosis as to the final results of treatment cannot be accurately made for several days after treatment has been instituted. In some cases, a much longer period of observation is needed to determine the prognosis. The exceptions are those cases of epiphyseal separation in young animals, which usually heal without much distortion or limitation of motion if properly reduced; fractures into the joints, which usually result in interference with normal joint motion, and in the case of fractures extending into the tarsal joint are apt to terminate fatally; and those cases that are obviously hopeless because of a severed blood supply or because of extensive bone or soft tissue damage. The future use and the sentimental and economic value of the animal has some bearing upon the prognosis. Some animals (tables 1 and 2) responding with good and fair functional results would have had no value as racing or show animals, but were valuable as broodstock or as pets although some distortion or limitation of motion resulted.

Blood and Spinal Fluid Examinations Do Not Aid Scrapie Diagnosis

Hematologic and biochemical tests failed to demonstrate any significant difference between the blood of 10 clinically healthy and 10 scrapie-affected goats of comparable age and sex. Similar tests showed no significant difference between the cerebrospinal fluid of 3 clinically healthy goats and 5 scrapie-affected goats.—*J. Comp. Path. & Therap., 70, (April, 1960): 197.*

A Method for the

Isolation of Leptospires

from Voided Urine by Direct Culture

Robert W. MENGES, D.V.M., M.P.H.
Bruce D. ROSENQUIST, D.V.M.
Mildred M. GALTON, SC.M.

IN A PREVIOUS report,[5] a method was described by which urine for direct culture in a leptospiral medium could be obtained from living animals. The urine was obtained by puncture of the bladder through the abdominal wall. This method has proved successful for small animals, such as dogs and cats, and may be applied to young pigs and calves, but it is impractical for mature swine, cattle, horses, and for man.

In an attempt to obtain urine from a guinea pig experimentally infected with *Leptospira pomona* by bladder tap, the guinea pig voided urine on the table. The voided urine was drawn into a syringe and 1 drop was inoculated into each of 2 tubes of Fletcher's semisolid medium. Leptospires, and bacterial contaminants, were found in 1 of the culture tubes. A second direct culture of voided urine from this guinea pig was made and leptospires were isolated in pure culture. The urine specimens were obtained the 123rd and 124th days after the guinea pig was inoculated with *L. pomona* organisms.

Previous studies in this laboratory indicated that an inoculum of 1 drop, rather than 3 drops, of urine per 5 ml. of medium was better for the isolation of leptospires. This suggested that further dilution of the urine might be worthwhile. Voided urine from an *L. pomona*-infected guinea pig was diluted 1:10 and 1:100 with buffered 0.85 per cent saline solution. Then 1 drop of the undiluted urine was inoculated into each of several tubes of Fletcher's medium[3] and a drop of each dilution was added to additional tubes of medium. All tubes inoculated with undiluted urine were contaminated, but pure cultures of leptospires were obtained from the diluted specimen. This indicated that the use of multiple dilutions would be of value, but the preparation of quantitative serial dilutions was not practical for application in the field.

A method to obtain bacteria in pure culture by dilution was tried many years ago.[2] The culture was diluted, then single drops were put in many separate containers of sterile broth with the hope that 1 of the drops would contain only 1 kind of organism. Thus the voided urine dilution studies reported here represent a new application of a very old technique.

The purpose of this paper is to present the findings on direct culture of voided urine samples from guinea pigs experimentally infected with *L. pomona*, Wickard, by a simple dilution technique.

Materials and Methods

Guinea pigs used in this study were experimentally infected with *L. pomona*, Wickard.* Young guinea pigs weighing 200 to 250 Gm. each were inoculated intraperitoneally with 2 ml. of a 10 per cent kidney tissue suspension from previously infected guinea pigs. All guinea pigs included were proved infected either by isolation from blood between the fourth and sixth day or from kidney, urine, or both at necropsy.

Urine samples obtained 6 days to 15 weeks after inoculation were collected by placing each guinea pig in a small wire basket on a clean enamel tray and waiting until it voided urine. It was necessary frequently to inject 10 ml. of sterile saline solution intraperitoneally into the guinea pigs in order to obtain a voided sample.

From the Department of Health, Education and Welfare, Public Health Service, Bureau of State Services, Communicable Disease Center, Atlanta, Georgia.

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*This strain was isolated in 1953 by Dr. E. V. Morse from the urine of a cow and has been carried by continuous passage every 4 to 5 weeks in guinea pigs.

No effort was made to sterilize the basket and tray before use. The urine was then withdrawn from the metal tray with a sterile, dry 2.0-ml. syringe and a 1-inch, 20-gauge needle. One drop of this undiluted urine was inoculated into 1 tube containing approximately 5 ml. of Fletcher's medium. With the same syringe, dilutions of the urine were prepared with sterile buffered 0.85 per cent sodium chloride solution** as follows. All but 0.1 ml. of the undiluted urine was discharged from the syringe, the needle was flamed, and 0.9 ml. of buffered sodium chloride was drawn into the syringe. A few drops of this 1-in-10 dilution of urine were expelled and 1 drop was then inoculated directly into 1 tube of Fletcher's medium. This procedure was continued for a total of 2 dilutions on 5 specimens, 5 dilutions on 20 specimens and 11 dilutions on 33 specimens. At first, a 1-oz. bottle of buffered sodium chloride solution was used as the source of diluent for each specimen; later, separate 1-dram vials of sodium chloride were used to prepare the first 3 dilutions and a 1-oz. bottle was used for the last 8 dilutions. Darkfield examinations were performed on 55 of the 58 urine samples cultured and findings by the 2 methods were compared.

Results

Of a total of 58 voided urine samples from 19 *Leptospira pomona* infected guinea pigs, 46 (79%) yielded leptospires. Pure cultures were isolated in at least 1 or more tubes in 42 (91%) of the positive samples.

The individual tube findings have been summarized (table 1) into 6 groups to show the approximate dilution, within the range of 11, which yielded the highest percentage of leptospiral isolations both in pure culture and with contaminating organisms. Group 1 includes cultures inoculated with undiluted urine and with the first dilution from 58 samples. Group 2 represents the second dilution for these 58 samples and the third dilution of 53 of them. Group 3 includes the fourth and fifth dilutions of these 53 samples. The last 3 groups are dilutions 6 and 7, 8 and 9, and 10 and 11 on 33 of the 58 samples. Leptospiral isolations increased as the urine became more dilute up to the sixth and seventh dilutions with 28 (42%) of the 66 tubes positive in pure culture. The number of positive cultures that were contaminated decreased after the fourth and fifth dilutions. As the urine became more dilute, the number of contaminated cultures that failed to yield leptospires decreased steadily; the number of cultures which had no growth increased gradually. The optimum dilutions appeared to be between the fourth and seventh dilutions; in fact, only 1 of the positive samples would have been missed above this point.

Darkfield examinations performed on 55 of the 58 specimens. Leptospires were observed in 33, 2 of which failed to yield positive cultures. However, leptospires were not found on darkfield examination of 12 samples that were positive by culture. Both samples in which leptospires were detected by darkfield, but not isolated in culture, were heavily contaminated in all 12 tubes, 1 with a rapidly growing Pseudomonas strain. The dilutions in which leptospires were isolated from the 12 samples negative on darkfield examination are shown (table 2). Since some of the samples were not diluted through the eleventh tube, no conclusions can be drawn; however, leptospires were isolated from 1 sample only in the tube inoculated with undiluted urine. The remaining 11 samples were positive by the second or third dilution.

TABLE 1—Findings on Direct Culture of Voided Urine from Guinea Pigs Experimentally Infected with *Leptospira pomona*

Urine samples	Total No. tubes	Leptospires isolated				Negative			
		Pure culture	(%)	Contam.*	(%)	No growth	(%)	Contam.	(%)
Group 1—undiluted & dilution No. 1	116	4	3	9	8	3	3	100	86
Group 2—dilution No. 2-3	111	25	23	19	17	14	14	53	48
Group 3—dilution No. 4-5	106	34	32	15	14	22	21	35	33
Group 4—dilution No. 6-7	66	28	42	5	8	15	23	18	27
Group 5—dilution No. 8-9	66	22	33	6	9	21	32	17	26
Group 6—dilution No. 10-11	66	18	27	4	6	26	40	18	27

*Contaminated.

**Prepared by adding 160 ml. of Sorenser's buffer solution to 1,840 ml. of 0.85 per cent of sodium chloride solution.

Discussion

In these studies, no special efforts were made to avoid bacterial contamination during collection of the voided urine samples; the most adverse conditions were used to provide an "acid test" for the method in the hope that it would prove practical for field application on cattle and swine.

In attempts to isolate leptospires from bovine urine by inoculation into young guinea pigs, it was found[7] that more consistent results were obtained when the urine was diluted (2:1) with buffered (pH 7.2) distilled water. More recently, isolations were obtained[1] by direct culture of urine samples diluted to 10^{-4}.

In the urine of patients with Weil's disease, low titer antibodies have been observed to have an inhibitory effect on the leptospires.[10] Removal of antibodies from the urine by absorption increased significantly the number of successful isolations by guinea pig inoculation. The inhibitory effect of antibody on leptospires in guinea pig kidney suspensions have been demonstrated.[8] In this laboratory absorption of urine from a canine *Leptospira canicola* carrier prior to inoculation into hamsters did not increase isolations significantly. *Leptospira canicola* was isolated from unabsorbed urine samples with titers as high as 1:512.

Since this method does not provide quantitative dilutions, carry-over of leptospires undoubtedly occurs. However, the primary objective of the study was not to develop accurate quantitation of the number of leptospires present, but to devise a simple method, which would be practical for field application, of isolating leptospires in pure culture from contaminated specimens.

It is of interest, however, to speculate as to the approximate dilution of the urine in the tubes of Fletcher's semisolid medium. To determine this, the average number of drops in 1.0 ml. of undiluted guinea pig urine were counted. This was found to be 30 when the syringe was held at a 25-degree angle. Therefore, each drop was equal to approximately 0.033 ml. It was observed that the number of drops per milliliter varied greatly depending on the angle at which the syringe was held. For each dilution, 1 drop (0.033 ml.) of urine was inoculated per tube, and each tube contained approximately 5.0 ml. of medium. Thus the urine in the first or undiluted tube had an approximate dilution of 1:153.

In addition to the dilution factor as an aid to decrease contamination, the medium and the relatively low incubation temperature (28-30 C.) may not favor the growth of bacteria, especially in the higher dilutions where the numbers may be small.

Contaminated tubes should not be discarded, because leptospires may grow well with some bacterial contaminants. In a few instances, the only positive tubes were the contaminated ones. In kidney cultures, on several occasions, leptospires were observed growing well with *Salmonella typhimurium*.

In this laboratory, limited studies with voided urine from cows indicate that if care is taken in collection of the sample, contaminating organisms appear usually in the cultures inoculated with the lower urine dilutions. The vulva of each animal was swabbed with sterile cotton and water and a midstream sample collected in a sterile wide-mouth, 1-pint glass jar.

This method is practical and should be of value for the isolation of leptospires from

TABLE 2—Findings on 12 Samples of Guinea Pig Urine, Negative on Darkfield Examination for Leptospira, Which Were Inoculated Undiluted and Diluted into Fletcher's Medium

Guinea pig (No.)	Weeks after inoculation	Urine dilutions											
		0	1	2	3	4	5	6	7	8	9	10	11
304	3	+[e]	c	c	−	−	−	....	....	....	....	....	....
294	3	c	+	+	+	−	+	....	....	....	....	....	....
291	3	c	+	+	....	....	....	....	....	....	....	....	....
293	9	c	c	+	....	....	....	....	....	....	....	....	....
300	4	c	c	c	+[e]	c	c	....	....	....	....	....	....
304	4	c	+	+	+	+	−	....	....	....	....	....	....
297	7	c	+	+	....	....	....	....	....	....	....	....	....
293	9	c	−	−	+	−	+	....	....	....	....	....	....
325	2	c	c	c	+	−	c	−	−	−	−	−	−
320	3	c	c	+[e]	c	c	+[e]	+	c	c	+	+	−
320	3	c	c	c	+	c	+	−	c	−	c	−	c
320	4	c	c	+[e]	+	+	+	+	+	−	c	−	−

+ = Leptospiral growth; − = no leptospiral growth; c = contaminated; +[e] = leptospiral growth and bacterial contamination.

suspected human cases and from both ill and carrier cattle, swine, and other large animals. Previous studies[6,9] indicate that in a majority of cases voided human urine relatively free from contamination can be obtained. The first reported isolation of *L. pomona* from man in the United States, was obtained by direct culture of a midstream voided urine sample[4]. The method is not recommended for dogs as the bladder tap technique is easily performed and a sterile specimen can usually be obtained without difficulty.

Summary

A method for isolation of leptospires by direct culture of voided urine involves preparation of a series of 11 dilutions of the voided urine in buffered saline solution with 1 syringe, and inoculation of 1 drop of each dilution into 5-ml. amounts of Fletcher's medium. Leptospires were isolated from 46 (79%) of 58 voided urine samples from 19 *Leptospira pomona*-infected guinea pigs. A pure culture of leptospires was obtained in 42 (91%) of the 46 positive samples. The voided urine dilution technique should be of value in detecting leptospiral carriers among cattle and swine herds, as well as for isolation from the urine of infected persons.

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Correction — Injectable Tranquilizers

The following references were inadvertently omitted from the report, "Injectable Tranquilizers for Weaning and Shipping Calves," on pages 239-240 of the Aug. 15, 1960, JOURNAL.

[5]Hendrickson, R. L., Nelson, A. B., Costello, W. J., Urban, Kenneth, Pope, L. S., Odell, G. V., and Reuber, H. W.: Effects of Feeding or Injecting Certain Tranquilizers on Beef Cattle Performance and Residues in the Carcass. Oklahoma Agric. Exper. Sta. 33rd Ann. Livestock Feeders Day Prog. Rep. (1959): 99.

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Predictive Effectiveness of the

Veterinary Aptitude Test

Eldridge E. SCALES, ED.D.

THE PROBLEM of the best selection of veterinary medical students is one of long standing. During the last decade, the increasing number of applicants and rising costs of equipment, faculty, and facilities have heightened the seriousness of this problem. More time and effort are demanded of admissions committees to select the best applicants. Postadmission decisions center around problems of retention, withdrawal, probation, and counseling of students. Proper selection can often prevent traumatic experiences of some students and may aid the instructor in working with those whose work is unsatisfactory.

This matter of selection is of particular concern at Tuskegee Institute. The freshman class size is predetermined. The question of whether the veterinary aptitude test (VAT) can be employed to select applicants with reasonable assurance was raised by the faculty of the school. One way to answer the question is to determine the effectiveness of the test as a predictor of success.

Purpose

The present study was undertaken to determine the effectiveness of the VAT as a predictor of success at the end of the first semester in the School of Veterinary Medicine at Tuskegee Institute.

Method

Beginning in the fall of 1952, each entering freshman was given the VAT during the first week of the semester. VAT is a battery of examinations selected because of their proved relationship to academic success in the study of veterinary medicine. It is valuable in the selection, admission, and guidance of students. Generally, it is administered prior to the admission of the applicant; however, all schools do not follow this practice.

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The battery consists of 3 parts: (1) reading comprehension, to measure scholastic aptitude as it relates to reading speed and comprehension with scientific reading materials; (2) science information, to test the student's fundamental education and information in the basic sciences, and to measure retention of past learning; (3) verbal memory, to measure student's capacity to memorize scientific materials. The combined score is derived from the total of scores made on the 3 separate parts of the test.

TABLE 1—Correlations Between Test Scores and First Semester-Obtained Grades for Entering Group of 1952 Through 1955

Predictor	Correlation with first semester grades
VAT* total score	0.51
Reading comprehension	0.40
Scientific information	0.49
Verbal memory	0.37

*Veterinary aptitude test.

The criterion of success was the grade point average at the end of the first semester. Grade point averages have been calculated as A = 40, B = 30, C = 20, D = 10, and F = 0. Taking the 87 freshmen of 1952 through 1955 as a base group, correlations between VAT scores and first semester grades were computed. A regression equation was obtained based on the VAT total score.

First semester predicted grades for the freshmen of 1956, 1957, and 1958 were calculated using the regression equation de-

TABLE 2—Relationship Between Predicted Grades and Obtained Grades for the 1952-1955 Group, 1956, 1957, and 1958 Classes

Entering class of:	No. of freshmen	Correlation based on VAT total score regression equation for freshmen of 1952 - 1955
1952 - 1955	87	0.56
1956	26	0.45
1957	34	0.48
1958	20	0.35

TABLE 3—Means and Standard Deviations of VAT Scores for the Classes of 1952-1955, 1956, 1957, and 1958*

	1952-1955			1956			1957			1958		
	N	M	S.D.	N	M	S.D.	N	M	S.D.	N	M	S.D.
VAT** total score	87	106.6	18.1	26	106.4	14.6	34	103.3	13.9	20	109.1	16.4
Reading comprehension	87	24.01	10.2	26	34.4	7.4	34	32.6	8.3	20	32.8	10.04
Scientific information	87	46.7	6.6	26	47.6	9.1	34	46.9	6.2	20	48.0	6.8
Verbal memory	87	30.6	5.7	26	23.9	5.6	34	23.8	4.6	20	22.7	5.3
First semester grade	87	22.98	9.1	26	21.4	8.6	34	20.8	7.6	20	22.8	7.3

*The differences between these groups are of such proportions that they probably do not account for differences in the correlations between predicted and obtained grades.
N = number of students; M = mean; S.D. = standard deviation.

termined on the 1952-1955 group. The predicted grades were compared with the obtained first semester grades (table 1).

Results

As expected, the VAT total score is a better predictor of grades than any single subtest. The regression equation for predicting first semester grade is:

Predicted first semester grade =
0.26 (VAT total score) −6.7

The predicted first semester grades of the entering classes of 1952 through 1955, 1956, 1957, and 1958 were computed using the regression equation. Obtained grades were then correlated with the predicted grades (table 2).

TABLE 4—Percentage of Students Who Did Not Earn Their Predicted Averages at the End of the First Semester

	Entering class of:			
	1952-1955 N = 87	1956 N = 26	1957 N = 34	1958 N = 20
Percentage with predicted grade of B who failed to earn a grade of B.	0 %	0 %	0 %	0 %
Percentage with predicted grade of C who failed to earn a grade of C.	6.7%	16.7%	15.8%	16.7%
Percentage with predicted grade of D who failed to earn a grade of D.	52.4%	38.5%	53.3%	37.5%

N = number of students.

The correlation coefficients of 0.45, 0.48, and 0.35 for the 1956, 1957, and 1958 classes, respectively, are to be compared with the correlation coefficient of 0.56 for the 1952-1955 class. Significance of difference tests revealed no signficant differences between these correlations. The means and standard deviations for these years are presented (table 3).

The classes of 1952 through 1955 comprise the group upon which the regression equation was based. The differences between the groups studied probably do not account for the differences in the correlations between predicted and obtained grades for these years.

A comparison of obtained and predicted grades (table 4) indicates that the original group of 1952 through 1955 had 6.7 per cent of the freshmen with predicted grades of C who failed to earn a first semester grade of C. There were 52.4 per cent of the freshmen of this group with predicted grades of D who failed. No student with a predicted grade of B failed to earn a first semester grade of B. These percentages are to be compared with similar percentages of the other 3 groups under study.

Summary

In an effort to ascertain the effectiveness of the veterinary aptitude test (VAT) as a selection instrument in the Tuskegee Institute School of Veterinary Medicine, the VAT total score was found to be the best single predictor of end-of-first-semester grades. There was no significant "shrinkage" in predictive efficiency over the years studied. This fact should be encouraging to those attempting first-semester predictions.

Anaplasmosis Losses Continue

Anaplasmosis continues to be one of the nation's major livestock disease problems Louisiana reported death losses of $4 million last year and total losses of $8 million. The nation's loss is estimated at $50 to $75 million per year.—*Breeder's Gaz., 125, (June, 1960): 22.*

Editorial

The Fluorescent Antibody Diagnosis of Rabies

Guest Editorial

The fluorescent antibody technique has received wide acclaim because it allows direct, visual observation of antigen-antibody reactions which previously had to be analyzed by complex biological indicator systems such as laboratory animals. The chief merits of fluorescent antibody technique, as applied to rabies, are speed and accurate diagnosis. The normal amount of time required between submission of a specimen and a final report is approximately 5 hours. Accuracy is inherent since this technique allows immunochemical visualization of rabies antigen. Thus, it is possible to demonstrate rabies virus in brain, independent of the presence of Negri bodies, and in salivary glands. Postexposure rabies treatment in man with vaccine is facilitated by rapid diagnosis and can be discriminately initiated in a matter of hours.

Rabies immune serum, usually of equine origin, is fractionated to extract the *gamma* globulins which, in turn, are coupled with fluorescein isothiocyanate, a fluorescent dye. The combination of fluorescein isothiocyanate and *gamma* globulins is commonly referred to as a conjugate. This conjugate is then dialyzed to remove the excess fluorescein isothiocyanate which has not been bound by the serum proteins, purified by absorption with acetone-extracted tissue powder, and stored frozen until use.

An ultraviolet light source is the heart of the fluorescent antibody equipment system. Such a light source is essential because fluorescein isothiocyanate will emit its characteristic apple-green luminosity only when illuminated with ultraviolet light. An intensive light source, such as a mercury vapor burner, is required because the light is passed through a series of complex filters. This ultraviolet light is then reflected to a cardioid darkfield condensor and ultimately through the specimen being examined. An ordinary microscope is used for observation, but an oil immersion objective with a numerical aperture of less than one is preferable; also, provision must be made to employ ocular filters which will protect the operator's eyes from ultraviolet burn.

The staining procedure is quite elementary, but must be carefully controlled. Brain and salivary gland tissue are harvested as they would be for ordinary rabies diagnosis. Fresh or frozen tissue are preferable, since glycerin preservation and formalin fixation interfere with the staining reaction. Impression smears are acetone-fixed on ordinary glass slides for 4 hours at −20 C. The conjugate is applied to the tissue smears and the slides are then incubated in a moist chamber for 30 minutes at 37 C. After incubation, the slides are washed in phosphate-buffered saline solution to remove any conjugate which has not been bound by rabies antigen on the slide. Finally, the slides are dried, and coverslips are mounted with glycerin which has been adjusted to pH 9. The high alkalinity of the glycerin is essential to assure efficient fluorescence. Examination of the slide is similar to any other microscopic examination; however, efficiency of interpretation is gained only through experience. The presence of rabies virus is indicated by areas of brilliant green fluorescence against a blue-gray background of normal tissue fluorescence.

At present, the fluorescent antibody technique is used in certain research laboratories and state diagnostic laboratories. The greatest factor which prevents wider utilization of this test at present is the high cost of equipment necessary to produce suitable reagents, e.g. refrigerated centrifuge, spectrophotometer, and analytical balance. The cost of an ultraviolet light source as well as accessory equipment, such as specialized filters, also makes it difficult for all but larger, well-endowed laboratories to adopt its use. It is quite probable that future availability of acceptable commercially prepared conjugates will obviate the need or much of the supplementary equipment and refinement of ultraviolet light sources will bring the cost of the over-all

technique within reach of smaller laboratories.

Thus, the fluorescent antibody test emerges as an exciting advance in the diagnosis of rabies. When properly executed, this technique establishes a highly specific diagnosis on test specimens within a few hours. The World Health Organization and the Communicable Disease Center of the U.S. Public Health Service are actively encouraging the adoption of this procedure in diagnostic laboratories, and CDC is implementing training programs in the use of the test. Those who have developed this new and useful test point out that exacting standards of performance, equipment, and reagents are necessary and these are related, among other factors, to the adequate training and proficiency of the diagnostician.—*Roger E. Wilsnack, D.V.M., United States Public Health Service, Wildlife Rabies Investigation Station, Poynette, Wis.*

Avoid Multiple Authors when Possible

There is a growing tendency on the part of scientific authors and investigators to include as co-authors everyone connected directly or indirectly with the work they are reporting. Although credit should be given when credit is due, persons who have contributed in only a small way to the reported work should not be considered co-authors but should be acknowledged in a footnote. It is not to the credit of an author, nor is it impressive to readers, to load the byline of an article with many names, especially when only a limited amount of work is reported.

Veterinary Service Emphasized by Some Advertisers, De-emphasized by Others

Veterinarians have long chafed under the advertising programs of firms promoting sales of veterinary products directly to farmers. Although veterinarians generally have not objected to advertisements and promotions advocating use of feed additives, worm treatments, and medications that can be applied with a reasonable degree of effectiveness by farmers, they have objected to advertising and promotion of products that might be easily misused in unskilled hands.

Another serious objection has been the conspicuous omission, in advertisements, of reference to veterinarians in connection with disease problems. Compare this with human medicine where even the label on a bottle of aspirin admonishes the user to consult his physician if symptoms persist. Advertising that, by omission, de-emphasizes veterinary service tends to defeat good disease control programs.

We commend the firms that recognize the worth of veterinarians and suggest in their advertisements that professional veterinary advice be sought, especially those who have made intensive efforts, through their advertisements in farm publications, to encourage farmers to consult veterinarians and use their services.

Increase in Funds for Veterinary Colleges

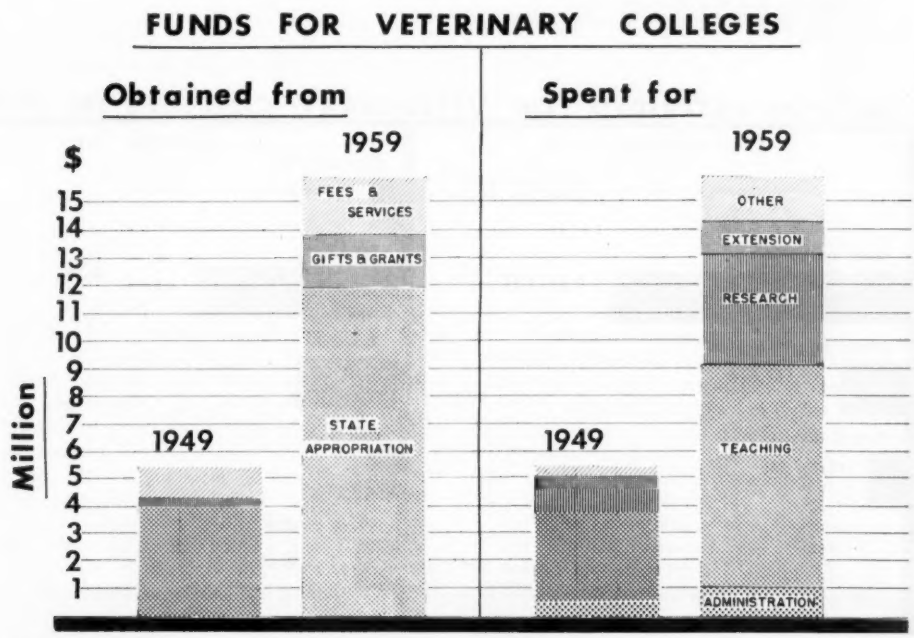
During the 10-year period 1949 to 1959, funds for veterinary colleges increased to approximately three times the 1949 level ($5,434,917 to $15,987,706). However, the 1949 funds supported 18 schools while the 1959 funds support 20 schools.

The relative amount of support from state appropriations was approximately the same during these years, but a marked increase occurred in grants and gifts (5.2% of the total school budgets in 1949; 16% in 1959) and a corresponding percentage decline occurred in the amount obtained from fees and services (18% in 1949; 9% in 1959).

The amount spent for research (16% of the school budgets in 1949; 25% in 1959), and other services (5.6% in 1949; 10% in 1959) increased sharply. During the 10-year period, the amount of money spent for research increased 4.6 times; for other services, 5.3 times. The amounts allocated to administration, teaching, and extension increased approximately 2.5 times during the 10-year period.

Funds for Veterinary Colleges

RESOURCES	1949	1959
State appropriations	$4,167,419	$11,952,684
Grants (federal and others)	281,871	2,567,874
Fees and services	985,627	1,467,148
Total	$5,434,917	$15,987,706
BUDGET		
Administration	$ 498,131	$ 1,194,174
Teaching	3,310,938	8,021,408
Research	873,395	4,005,649
Extensions	445,488	1,145,860
Other	306,965	1,600,631
Total	$5,434,917	$15,987,706



AVMA Council on Education — 1960

Funds for Veterinary Colleges United States and Canada—1959

Financial support for veterinary colleges in the United States and Canada is derived from state and provincial appropriations (75%); grants, including federal appropriations and gifts (16%); and from fees and services (9%).

Of the total resources, approximately 50 per cent is allocated to teaching, 25 per cent to research, and the remainder to other services such as extension and administration.

Resources

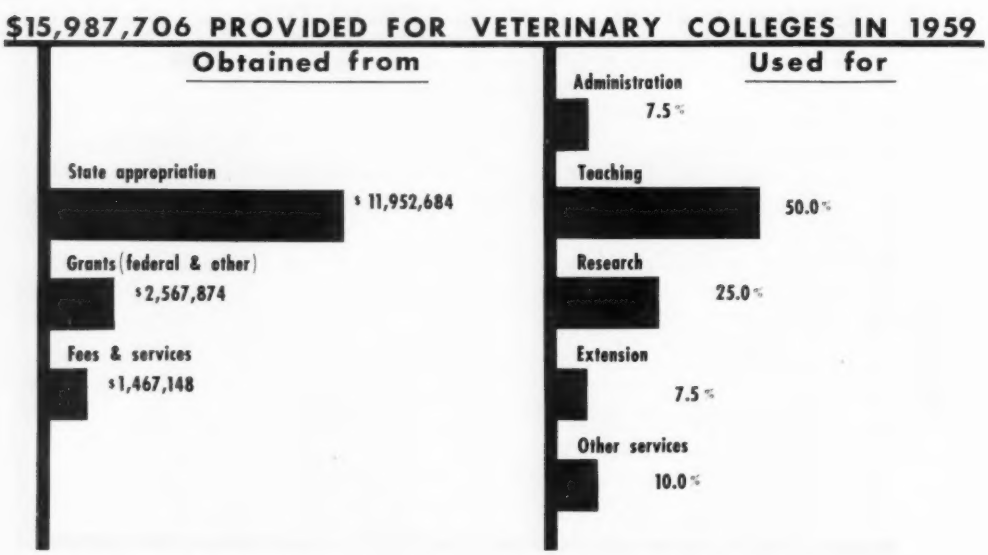
Source	Amount
State appropriations[1]	$11,952,684
Grants (federal, others)[2]	2,567,874
Fees and services[3]	1,467,148
Total	$15,987,706

[1]Includes regional payments from other states.
[2]Federal grants, $901,317; gifts and other grants, $1,037,684.
[3]Includes student fees, clinic fees, and other services.

Budget

Item	Amount	Per cent of total budget
Administration	$ 1,194,174	7.5
Teaching	8,021,408	50.0
Research	4,005,649	25.0
Extensions[1]	1,145,860	7.5
Other services[2]	1,600,631	10.0
Total	$15,987,706	100.0

[1]Includes diagnostic laboratory operation.
[2]Includes plant maintenance at two institutions.



AVMA Council on Education — 1960

from the *Research Journal*

Nasal Parasites in Monkeys

The nasal passages of 17 rhesus monkeys (*Macaca mulatta*) were examined histologically and 6 were found to be infected by *Anatrichosoma cutaneum*. The nematodes were located in the squamous epithelium and the lamina propria of the nasal mucosa. Some of the nematodes of the lamina propria evidently were free in the connective tissue; most of them were located within vessels. Chronic inflammatory reaction of minimal to moderate severity was present in the nasal laminae propriae of the monkeys.—[*A. M. Allen: Occurrence of the Nematode, Anatrichosoma cutaneum, in the Nasal Mucosae of Macaca mulatta Monkeys. Am. J. Vet. Res., 21, (May, 1960): 389-392.*]

Diagnosing B_{12} Deficiency in Individual Swine

Twelve fertile and 10 barren sows were given 250 μg. of vitamin B_{12} intramuscularly. Blood samples were taken prior to the injections and 24 and 48 hours after the injections. Serums were assayed for vitamin B_{12}. It appeared that there was a relationship between vitamin B_{12} and the reproductive failures studied, and that the ratio of preinjection to postinjection serum levels was a better discriminator of this relationship of the vitamin B_{12} status of individual sows than preinjection serum levels by themselves. Discriminant analysis revealed that the probability of an incorrect classification may be 13 to 19 per cent when the ratio is applied to individual animals to detect sterility associated with a vitamin B_{12} deficiency. Sows in these herds should have ratios of 0.60 or greater to have at least a 93 per cent chance of producing living offspring.—[*G. L. Frederick: A Relationship Between Vitamin B_{12} and Reproduction, and a Method of Diagnosing Vitamin B_{12} Deficiency in Individual Swine. Am. J. Vet. Res., 21, (May, 1960): 478-481.*]

New Books

The Veterinary Annual

In this first year of publication, the 1959 annual incorporates a wide variety of subjects pertaining to veterinary medicine which are discussed as reviews of current literature. Most topics concern diseases of large and small animals, but a liberal amount of space is devoted to general topics.

Special articles, dealing with the problems and projects of veterinary medicine in several countries, make up the first 40 pages and seem to be directed principally to veterinarians engaged in regulatory and public health activities, as are the sections on brucellosis and tuberculosis.

Especially valuable to the veterinary practitioner are the sections dealing with prevention and treatment of various diseases and the chapters dealing with topics such as radiology, pharmacology, and therapeutics.

The section on new drugs and appliances concerns products available in Great Britain, although their counterparts may be obtained in the United States. Like the section on legal matters, this section has limited usefulness in countries other than Great Britain.

The book is indexed adequately, and each of the 44 authors, most of whom are in Great Britain, is an authority in his particular field. —[*The Veterinary Annual. Edited by W. A. Pool. 363 pages; illustrated. Williams and Wilkins Co., Baltimore, Md., exclusive U.S. agents. 1959. Price $8.75.*]

Law for the Pet Owner

This book is one of a series of 50 dealing with specialized legal subjects. Sections pertaining to purchase and sale of pets, gifts, warranties, general liabilities, liens, licensing, and advertising are included.

Written in nontechnical style, the book can be readily understood by the layman. Information relating to specific situations will prove to be especially valuable. For veterinarians who deal with pet owners or for pet owners themselves, the book is worthwhile. —[*Law for the Pet Owner. By David S. Edgar, Jr. Legal Almanac Series No. 49. 92 pages. Oceana Publications, Inc., 80 Fourth Ave., New York 3, N. Y. 1960. Price $1.00, paperback; $2.00, clothback.*]

The Aetiology of Infective Diseases

Professor Lovell strives to emphasize the constantly changing nature and relationship of diseases in both man and animals. It is the author's intent to make his reader abandon any tendency to think of each disease as a separate entity.

Among the subject areas of Part 1 are the normal bacterial flora in animals, immunity to diseases, and the instability of the host-parasite relationship.

Part 2 deals with factors in infectious diseases. Age, sex, and changing diet of the host are discussed in correlation with many diseases. Fungal infections, effects of trauma, stress, and fatigue and their treatment with properdin and adrenocorticoids, and infections involving a live vector as well as a pathogen complete the list of general areas covered.—[*The Aetiology of Infective Diseases with Special Reference to the Subsidiary and Important Nonspecific Factors. By Reginald Lovell. 136 pages. Angus and Robertson, Ltd., London, England. 1958. Price about $4.00 (adapted from review in Nature, 186, (May 21, 1960): 581-582).*]

Clinical Veterinary Surgery

This book on operative procedures is a companion to volume I, published last year and reviewed in this JOURNAL (Oct. 1, 1959: 400). The publisher's note expresses the hope that this work will enable the veterinary surgeon to approach operative surgery with a greater degree of confidence. This reviewer feels that their objective will be achieved.

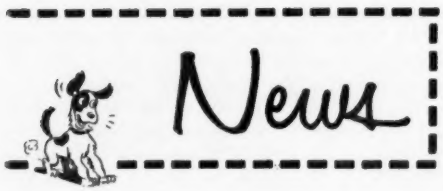
Transatlantic differences are likely to be encountered; for example, the Ward Finnemore needle is not likely to be familiar to North American workers, and the statement that catheterization of the bull cannot be used is somewhat sweeping. For removal of penile neoplasms, casting and epidural anesthesia are recommended in contrast to the North American technique of employing either a pudendal block or tranquillizer and local infiltration.

It is to be hoped that in the next edition the authors will include more on abdominal surgery in the horse and also orthopedic surgery in this species, for such techniques are being employed with increasing frequency in equine practice.

The occasional typographical error has unfortunately crept into the text; for example, "maternal" is incorrectly spelled on page 80, and the French worker referred to on page 111 is "Marcenac." The first reference on page 393 is incorrect.

The illustrations add clarity to many of the techniques described; for example, those depicting the "roaring" operation are excellent. The chapter on surgical procedure could be read by everyone with benefit, and the statement, "While cleanliness is paramount, results are also dependent upon surgical methods of gentleness and rapidity of working so that handling of the tissues and exposure are reduced to the minimum," should be memorized by all veterinary students.

For greatest value, this volume should be consulted along with volume I. The authors are to be commended for producing a much-needed text on veterinary surgery.—[*Clinical Veterinary Surgery. Vol. 2. By A. C. Shuttleworth and R. H. Smythe. 393 pages. Illustrated. Charles C Thomas, 301-327 E. Lawrence Ave., Springfield, Ill. 1960. Price $9.00*]—F. J. MILNE.



Review of Foreign Animal Quarantine Programs

A special group to review U. S. animal quarantine programs has been appointed by Dr. L. C. Heemstra, director of the Animal Inspection and Quarantine Division of the USDA Agricultural Research Service.

Dr. Heemstra requested the review to assure that the Animal Inspection and Quarantine Division is taking every possible action to protect the United States from foreign animal diseases. The six group members were selected from various fields so that several aspects of the division's activities could be studied.

Although the present system of animal quarantine has successfully protected against several important animal diseases for the last 50 years, increased travel and trade, and high-speed international jet air freight, have made the job much more complex.

Members of the review group are: G. S. McIntyre, director of the Michigan Department of Agriculture, Lansing; Dr. W. A. Hagan, director, USDA National Animal Disease Laboratory, Ames, Iowa; Dr. W. R. Krill, dean, College of Veterinary Medicine, Ohio State University, Columbus; Dr. J. R. Hay, director of professional relations, AVMA, Chicago; Col. Fred D. Maurer, Armed Forces Institute of Pathology, Walter Reed Medical Center, Washington, D.C.; Dr. C. L. Campbell, Florida state veterinarian, Tallahassee; and group chairman Dr. C. D. Van Houweling, assistant administrator of the regulatory programs.

Young Scientists Show Interest in Medical Careers

More than 20 per cent of the 356 young scientists who were finalists at the Eleventh National Science Fair-International plan professional careers in medical science. Of this number, 15 want to work in fields other than human medical research and practice:

Review group appointed by the Animal Inspection and Quarantine Division, USDA Agricultural Research Service, to evaluate the Nation's protection system against foreign animal diseases. Group members are from left to right: Dr. Paul Lanphear, Dr. B. C. Swindle, Dr. J. R. Hay, Dr. W. R. Krill, Col. F. D. Maurer, Mr. C. R. Ranek, Dr. Claude A. Smith, Mr. G. S. McIntyre, Dr. W. A. Hagan, and Dr. C. L. Campbell. Dr. C. D. Van Houweling, group chairman, took the picture.

veterinary medicine, nursing, medical technology, pharmacy, and psychology.

The other high school students have chosen physics (13%), engineering (12%), biological science (10%), unspecified areas of science or research (8%), chemistry (7.6%), and teaching in science or mathematics (6%). Six per cent are undecided or interested in areas other than science.—*Sci. News Letter, 77, (May 28, 1960): 343.*

Dr. J. D. Hatton Promoted

Dr. James D. Hatton (OKL '52) has recently been promoted to a staff position in Trade Labels and Standards of Identity in Washington, D.C. He was transferred from a supervisory position in the New York City station of the Meat Inspection Division of the U.S. Department of Agriculture.

Dr. James D. Hatton

Dr. Hatton entered the meat inspection service as a student trainee in 1951 at Wichita, Kan., and served in later assignments at Reading, Pa., and Evansville, Ind.

Change in Department of Anatomy at Cornell

The New York State Veterinary College has recently transferred instruction in microscopic and developmental anatomy of domestic animals from the Department of Zoology to the Department of Veterinary Anatomy.

The appointment of Dr. Al W. Stinson (GA '56) as assistant professor of veterinary anatomy made it possible to bring this instruction into the veterinary college.

For the last four years, Dr. Stinson was an instructor in histology and embryology at the University of Minnesota College of Veterinary Medicine, where he applied the technique of electron microscopy to research on the cytology of bovine uterine epithelium.

New Department at Medical School for Laboratory Animal Veterinarians

The Vivarium, said to be the first graduate program for laboratory animal veterinarians, has been established by the Bowman Gray School of Medicine of Wake Forest College, Winston-Salem, N.C.

The college set up the department as part of its over-all medical research program. Its purpose is to train veterinarians in the field of laboratory animal medicine for work in medical schools and research laboratories where animals are used in experimentation. Advanced training in this specialty has never been offered before.

Candidates will have a two-year training period in the five departments of the medical school. The Vivarium will be housed in a two-story annex to the medical school that has facilities for 250 dogs, 60 primates, and 3,000 small animals, as well as laboratory and research work.

Contract Program Well-Received in Indiana

A north central Indiana veterinarian, Dr. Owen A. Ranstead, was cited in the July, 1960, *National Hog Farmer* for his progressive contract program on livestock health.

The program was initiated last September and has grown slowly because men interested in this type of service need time to build facilities needed to make it work. The swine program is being built with herds of 100 sows or more. To date, 6 swine farms and 5 dairy herds are included.

Dr. Ranstead's goal is 10 hog farms and 10 dairy operations which will give him a full schedule of 2 hours each week at every farm.

Presently, Dr. Ranstead is paid a stated

fee for each hog marketed or kept as breeding stock. He furnishes all drugs and does all the vaccinating, performs hemoglobin determinations on half of each litter when they are 3 weeks old, and plans much of the management. One of the first clients to cooperate with Dr. Ranstead on a contract basis gives him all the credit for improvement in farrowing rate because of the nutrition program he recommended.—*National Hog Farmer (July, 1960): 10.*

Field Test Kit for Antibiotics Available

A field test kit for detecting penicillin and other antibiotics in milk has been developed at Cornell University. The field kit is simple enough for a farmer to test his own cows, is sensitive to the point of detecting 0.05 I.U. of penicillin per milliliter of milk, and versatile enough to be carried about without refrigeration. It is expected, however, that its greatest value will be to regulatory officials and field supervisors. The General Ionics Corporation is producing the commercial kits of this type.—*Feedstuffs (July 2, 1960): 52.*

Third Cow Pool Underway

THIRD COW POOL UNDERWAY.—The third commercial cow pool in Iowa is operating on 10 acres near Waukon. It provides facilities, feed, and labor to cow owners who pay to have their cows fed, milked, and cared for.

The cow pool also contracts with a grade A market, handles hauling the milk to market, and keeps production costs down. All facilities are new, including loafing shed, milking parlor, holding pen, pipeline milk handling system, and a 2,000-gallon bulk tank.

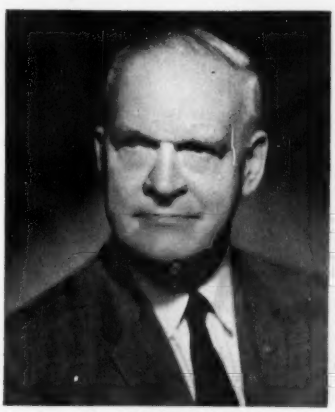
Many pool patrons are producers who are living in areas where no grade A market is available and have been producing for grade B markets. They sign a three-year contract with the pool and pay a yearly fee of $30 per cow, cost of feed and breeding fees, and a prorated share of costs of labor, veterinary fees, electricity, heat, and supplies. Cow owners also pay for transporting milk to a grade A market and a management fee of 5 per cent of their milk check. There is a charge of $3 a month for caring for cows during their dry periods, plus cost of grain and also of hay in the winter.

Sales income is credited to the patron. Bull calves are usually sold for veal when about a week old; in early June, they brought $23 each. Heifer calves sold as potential milk cows brought $35.

The cow pool is owned by J. R. White and managed by Len Stock, a former hardware store owner and once operator of an automobile agency.—*Feedstuffs (July 9, 1960): 16.*

Dr. F. C. Mau Retires From ARS at Chicago Stockyards

Dr. Fred C. Mau (MCK '18) retired May 31, 1960, after 42 years of service with the U. S. Department of Agriculture. He was veterinarian in charge of the Animal Disease Eradication Division, Agricultural Research Service, Union Stockyards, Chicago, Ill.



Dr. Fred C. Mau

Dr. Mau entered the Meat Inspection Service under the former Bureau of Animal Industry in 1918. His experience in the regulatory veterinary field includes working with foot-and-mouth disease, dourine, hog cholera, anthrax, European fowlpest, tuberculosis, sheep and cattle scabies, vesicular exanthema, and glanders. He assisted in forming and amending regulations for the interstate movement of livestock. Dr. Mau has also written several short articles on the contributions of federal service veterinarians to public and livestock industries. His most recent article appeared in the University of Iowa alumni magazine.

Dr. Mau is now helping to establish a meat

and poultry inspection service in Illinois under the Illinois State Department of Agriculture. His title is Superintendent of Meat and Poultry Inspection.

All States Now Ban Raw Garbage

Raw garbage feeding operations in Connecticut were in violation of the law for the first time beginning July 1 when a new state act went into effect. This act completed the list of continental states to bar the feeding of garbage to swine unless it has been boiled for at least 30 minutes in an approved manner.—*National Hog Farmer (July, 1960): 14.*

Stilbestrol Patent Profitable

A patent on stilbestrol held by the Iowa State University Research Foundation has reaped between $750,000 and $1 million for the Foundation.

The idea of feeding low levels of stilbestrol to beef cattle to stimulate growth was patented by the Foundation before 1954 when research proved it effective. A pharmaceutical manufacturer was granted the rights to use the patent to produce stilbestrol for feed use. The Foundation receives royalties from the manufacurer.

Last year the Foundation had a net profit of $125,000 from stilbestrol. Dr. Wise Burroughs of Iowa State, the developer of stilbestrol feeding, receives 15 per cent of the royalties.

Profits from research patents are unusual. In most cases, return revenue is insufficient to cover patenting costs.—*Feedstuffs (July 2, 1960): 8.*

USDA Awards Grant for Liver Fluke Study

The U.S. Department of Agriculture has awarded $38,698 to the Veterinary Institute of Pulawy, Poland, for a four-year study of liver flukes. The study will be aimed at finding chemical methods of control and destruction of the worm parasite of livestock.

This foreign research, conducted by the foreign research and technical programs division of USDA's Agricultural Research Service, is financed with foreign currencies accruing to the United States account from the sale of surplus agricultural commodities under the Agricultural Trade Development and Assistance Act of 1954.

The grant to the Veterinary Institute of Pulawy is one of seven research grants recently awarded by USDA under this program.

Society of Nuclear Medicine Meets in Colorado

The seventh annual meeting of The Society of Nuclear Medicine was held at the Stanley Hotel, Estes Park, Colo., June 22-25, 1960.

Over 70 speakers presented new scientific information covering every phase of research, medicine, and surgery as it concerns the use of nuclear phenomena in the diagnosis and treatment of disease. Special emphasis was given to the diagnosis and treatment of thyroid disease, therapeutic use of radioisotopes and "tools of the trade."

The first annual address of the nuclear pioneers series was delivered by Dr. Edward Teller of the University of California. This first address honored the late Dr. Ernest O. Lawrence.

The meeting was open to all physicians, veterinarians, nurses, physicists, technicians and other scientists working with, or interested in utilizing, radioisotopes in the health field. All information on the meeting was secured through: Mr. Samuel N. Turiel, Administrator, the Society of Nuclear Medicine, 430 N. Michigan Ave., Chicago 11, Ill.

Mail-Order Prescriptions Condemned by APA and AMA

The American Medical Association, at a recent meeting in Miami Beach, Fla., condemned mail-order prescription plans, saying they are not in the best interest of the patient.

After discussing mail-order merchandising of prescription drugs with the American Pharmaceutical Association and the National Association of Retail Druggists, AMA officially stated that "This process requires patients to send prescriptions, sometimes at great distance, to the center of drug distribution. In this process, the direct personal relationship which exists between the pa-

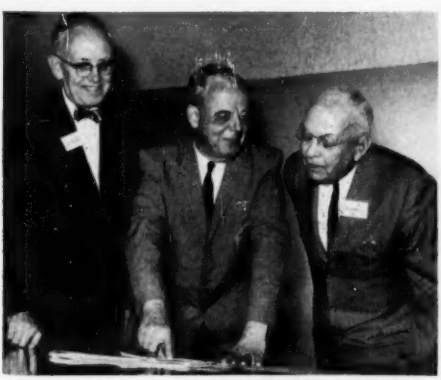
tient-physician-pharmacist at the community level and which is essential to the public health and welfare of patients is lost. . . . The unorthodox practice of mail-order filling of prescription drugs is not in the best interest of the patient except where unavoidable because of geographic isolation of the patient."—*American Pharmaceutical Association, June 16, 1960.*

Among the States and Provinces

California

SOUTHERN CALIFORNIA V.M.A. SPONSORS SYMPOSIUM—A symposium on abdominal surgery was conducted at the Ambassador Hotel, Los Angeles, Calif., March 15-16 under the auspices of the Southern California V.M.A.

Colorado



Three trustees of the Morris Animal Foundation confer at their annual conference in Boulder, Colo., July 5-7. Left to right are: Drs. James B. Allison, director of the Bureau of Biological Research, Rutgers University; William A. Hagan, director of National Animal Disease Laboratory, U.S. Dept. of Agriculture, Ames, Iowa; and George R. Cowgill, professor emeritus of Yale University and former editor of the *Journal of Nutrition*. The Foundation sponsors research in veterinary colleges of the country and assists in education of young graduate veterinarians through such projects.

The speakers included Drs. James F. Neal, A. & M. College of Texas—corrective shoeing of horses; O. R. Adams, Colorado State University, Fort Collins—differential diagnosis and treatment of hindleg lameness in cattle; Mark W. Allam, University of Pennsylvania, Philadelphia—surgery of the gastrointestinal tract; W. A. Lumb, Michigan State University, East Lansing—surgery of the urogenital system; C. Lawrence Blakely, Boston, Mass.—hernia repair; and Jacob Markowitz, University of Toronto, Ontario—recent advances in veterinary surgery. A panel of the speakers and moderator Dr. Crundwell in a question and answer session concluded the program.

Illinois

Dr. Frank Kral, professor of veterinary medicine at the University of Pennsylvania, conducted a 2-day post graduate seminar in dermatology at the Edgewater Beach Hotel in Chicago June 12-13. Some 200 veterinarians attended the symposium, sponsored by Chas. Pfizer and Co., Inc. Among the participants were (left to right) — Drs. Robert E. Storm, Evanston, Ill.; F. Kral; Charles H. Armstrong, Skokie, Ill.; Lee Schwartz, Chicago; and Myron Bernstein, Glencoe, Ill.

Maryland

PREVETERINARY PROGRAM AVAILABLE.—A preveterinary curriculum is offered by the

College of Agriculture, University of Maryland, College Park. Since the University does not have a school of veterinary medicine, the curriculum fills admission requirements of the Schools of Veterinary Medicine at the University of Georgia and Tuskegee Institute. Georgia allots 10 spaces and Tuskegee 2 to Maryland applicants.

Students in the preveterinary program compete for Georgia and Tuskegee spaces. Those who are not among the 12 selected seek admission to veterinary colleges in nearby states, adjusting their curriculums to fill other university admission requirements.

Students are advised upon entering Maryland's preveterinary program to decide whether they would prefer to continue in the College of Agriculture or the College of Arts and Science if they do not obtain admission to a school of veterinary medicine. Education in another field can then be continued with a minimum loss of time.—*Maryland Vet. (June, 1960): 11.*

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NEW OFFICERS.—Dr. Donald R. Lynch (COR '46) of Frederick, has been elected president of the Maryland State V.M.A., succeeding Dr. Walter Hastings, Jr. (UP '42), of Cambridge.

Other new officers are Dr. Charles G. Ziegler (UP '34), of Catonsville, first vice-president; Dr. Irwin M. Moulthrop (COR '31), of Salisbury, second vice-president; and Dr. Harry L. Schultz, Jr. (UP '50), of Baltimore, secretary-treasurer.

Minnesota

MINNESOTA SOCIETY HAS 63RD ANNUAL MEETING.—About 900 registrants attended the 63rd Annual Meeting of the Minnesota State V.M.S., Jan. 25-27, 1960, at the Hotel St. Paul, St. Paul.

New officers elected at the meeting are Drs. R. S. Kufrin, Benson, president; Fred W. Gehrman, Minneapolis, president-elect; V. L. Dahl, Arlington, first vice-president; J. N. Karcher, Minneapolis, second vice-president; and B. S. Pomery, St. Paul, secretary-treasure. Dr. A. B. Magnusson, Blooming Prairie, was elected as a member of the Board of Trustees.

The section on general practice was opened by Dr. V. L. Dahl, Arlington, second vice-president. The speakers and their subjects were Drs. G. H. Conner, East Lansing, Mich.—bovine surgery; Erskine V. Morse, Ames, Iowa—leptospirosis in cattle and swine; E. E. Leasure, Manhattan, Kan.—the AVMA; and C. T. Mason, Little Rock, Ark.—beef cattle practice. A panel discussion of problems of general practice was moderated by Dr. V. L. Dahl and included Drs. Paul Cox, E. H. Connor, E. V. Morse, E. E. Leasure, and C. T. Mason.

Dr. John Wright, Hopkins, presided over

Newly elected officers of the Minnesota State Veterinary Medical Society are Dr. Fred Gehrman (left), president-elect and Dr. R. S. Kufrin, president.

the first section on small animals which included a motion picture, "Surgery on the Juvenile Cataract in the Canine" by Schering Corp., and a symposium on immunization for canine distemper, infectious hepatitis, and leptospirosis. Members of the symposium were Drs. George L. Ott, Grafton, Wis.; R. V. Johnson, Indianapolis, Ind.; and Vincent Marshall, Omaha, Neb. The interrogation panel was made up of Drs. George Mather, St. Paul; Ben Porter, St. Louis Park; C. J. Rosell, St. Paul; and John F. Donovan, Detroit, Mich.

A film, "Your Meat Inspection Service," opened the second section on general practice, Dr. R. S. Kufrin, Benson, president-elect, presiding. The audit committee report was given by Dr. John Busch, Chokio. Dr. S. S. Bjornson, West Fargo, N. D., discussed disease problems of swine at terminal market; Dean E. E. Leasure, Manhattan, Kan., veterinary medicine; Drs. D. F. Fienup, St. Paul—agriculture in years ahead; and L. J. Goss, Cleveland, Ohio—zoo veterinarians. The afternoon session was presided over by Dr. John Higbee, St. Paul, and was opened with the report of the activities of the veterinary examining board by Dr. A. C. Spannaus, Waconia, followed by Drs. Ronald Rosanove, Rochester—penicillin in milk; D. E. Bartlett and L. L. Larson, Madison, Wis.—reproductive problems in cattle; and F. E. Eads, Detroit, Mich.—drugs.

The second section on small animals, presided over by Dr. Fred Gehrman, Minneapolis, first vice-president, heard Dr. John F. Donovan, Detroit, Mich.—examination room techniques; Dr. L. J. Goss, Cleveland, Ohio—care and treatment of exotic pets; and Dr. Donald G. Low, St. Paul.

The final sessions, Dr. T. P. Nankervis, Eveleth, board of trustees, and Dr. Glen Nelson, New Richland, president, presiding, included Drs. J. G. Fling and Daniel Werring, St. Paul—disease control programs; Harry Johnson, Littleton, Colo.—equine practice; a panel discussion on the development of a poultry practice moderated by Dr. B. S. Pomery, St. Paul, and including Drs. W. E. Matteson, Willmar; Francil Knippling, Milaca; G. R. Lyon, Pelican Rapids; William J. Cameron, Luverne; E. R. Holland, Caledonia; G. W. Peterson, Willmar; Harry Olson, St. Paul; and R. B. Mericle, Nevada, Iowa; and Dr. H. C. H. Kernkamp, St. Paul—parenteral hematinics in the prevention and treatment of anemia in baby pigs.

Thirteen veterinarians were honored with life memberships for their 40 years of membership: Drs. H. C. Butler, Madelia; J. O. Carlson, Granite Falls; R. A. Dean, St. Peter; E. N. Erickson, Anoka; R. Fenstermacher, St. Paul; A. L. Lee, Howard Lake; F. C. Osborn, LeSueur; J. X. Parent, Foley; N. A. Roettiger, Winona; C. T. Tompkins, California; Guy VanDuzee, Lamberton; A. R. Werring, Springfield; and W. T. Williams, Brooten.

The 1961 meeting will be held at the Leamington Hotel, Minneapolis, Jan. 23-25.

Missouri

MISSOURI V.M.A. CONVENES IN 68TH ANNUAL MEETING.—The Feb. 21-23, 1960, meeting of the Missouri V.M.A. convened at the Hotel President, Kansas City, with an attendance of 486.

New officers of the Missouri V.M.A. are Drs. E. G. Bailey, Jr., Dexter, president; F. D. Gentry, Springfield, president-elect; P. E. Kimball, Stanberry, vice-president; and Paul L. Spencer, Jefferson City, secretary-treasurer (eighth term).

Program participants were Drs. Dan J. Anderson, Fort Worth, Texas—equine practice, and AVMA affairs related to the individual; James Archibald, Guelph, Ont.—diseases of the musculoskeletal system, and urinary tract surgery; V. G. Crago, Youngstown, Ohio—modern approach to practice and small animal hospital management; Mr. Richard E. Fister, Clayton—pensions and trust funds; Drs. Harvey T. Helms, Trimble—baby pig diseases; John B. Herrick, Ames, Iowa—bovine sterility and cow-pool operations; J. E. Lovell, Ames, Iowa—artificial insemination in swine; E. R. Price, Jefferson City—the veterinarian in a county health organization; C. B. Ratchford, Columbia—Missouri's agricultural extension service; J. D. Ray, White Hall, Ill.—respiratory diseases in swine; W. T. S. Thorp, Minneapolis, Minn.—veterinary medicine and other medical sciences; M. J. Twiehaus, Manhattan, Kan.—leptospirosis; and Newton B. Tenniville, Stillwater, Okla.—radiographic evaluation of esophageal diseases and evaluation of the diagnosis and treatment of fractures.

Awards were presented to Dr. Stanwood W. Haigler, St. Louis, the sixth winner of the Missouri Veterinarian of the Year Award, and to Mr. Frederic H. Olander, Kansas City, the second winner of the Distinguished Service Award, for his work

The newly installed officers of the Missouri V.M.A. are (left to right) Drs. F. D. Gentry, president-elect; Paul L. Spencer, secretary-treasurer; and E. G. Bailey, Jr., president.

in improving livestock marketing and industry through his position as chairman of the Sanitary-National Livestock Loss Prevention Board of Livestock Conservation, Inc. Special awards were made for service to the Association: Dr. L. A. Rosner, Jefferson City, state veterinarian; Dr. A. H. Groth, Columbia, dean of the School of Veterinary Medicine, University of Missouri; Dr. James C. McCrea, Platte City, chairman of the Feed Industry Committee; and Mr. Lloyd S. Larson, executive vice-president of the Midwest Feed Manufacturers Association, Kansas City, for his work in bettering veterinarian-feed dealer relationships, direction of the five regional veterinarian-feed dealer conferences in 1959, and direction of the two Midwest veterinary nutrition conferences.

Dr. S. W. Haigler (left), St. Louis, receives the 1960 Veterinarian of the Year Award from Dr. W. H. Mowder, president of the Missouri V.M.A.

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DR. HAIGLER RECEIVES MISSOURI AWARD.—Dr. Stanwood W. Haigler, St. Louis, was named "Veterinarian of the Year" at the convention of the Missouri V.M.A. in Kansas City, Feb. 22, 1960.

Dr. Haigler has been a practicing veterinarian since 1918 when he was graduated from McKillip Veterinary College, Chicago, and practiced in Kansas City prior to moving to St. Louis in 1924. He is a member of the AVMA and the Missouri V.M.A., serves as chairman of membership and inspection committee of the American Animal Hospital Association, and founded the Greater St. Louis V.M.A. He has served for the past 12 years as a member of the State Veterinary Examining Board.

New Jersey

V.M.A. CONVENES IN ANNUAL MEETING AND WORKSHOP—The New Jersey V.M.A. opened its 76th annual meeting March 30, 1960, and climaxed its three-day session in a Workshop for District 2 of the AVMA on April 1. The meetings were held at the Claridge Hotel in Atlantic City.

Wednesday morning speakers were: Drs. Ryland Croshaw, Columbus, a color film, "Bovine Surgical Procedures"; John L. Mc-

Auliff, Cortland, N. Y.—clinical diagnosis and control of bovine mastitis; Robert L. Booth, Middleburg, Va.—pony practice; W. Brian Singleton, London, England—differential diagnosis of stifle conditions in the dog.

The afternoon session, coordinated by Dr. William J. Foster, Clifton, offered three workshops. The radiography session was led by Dr. Robert B. McClelland, Buffalo, N. Y., with Dr. William H. Rhodes, Philadelphia, Pa., and Arthur C. Koenitz, Livingston, an x-ray sales engineer. Ophthalmology was the subject of the session led by Dr. Leonard Krawitz, Philadelphia, Pa., with Dr. John E. Whitehead, New York, N. Y., and Dr. Samuel Pollock, South Orange. The third workshop, lead by Dr. Wayne H. Riser, Washington, D. C., dealt with clinical laboratory procedures.

The Thursday morning session featured Dr. Krawitz's film, "Various Surgical Procedures Involving the Canine Eye"; Dr. Riser—diagnostics in feline medicine; Dr. A. S. King, Bristol, England (visiting professor at University of Pennsylvania)—intervertebral disk syndrome in the cat; Dr. Singleton—surgical correction of stifle conditions in the dog; and Dr. Booth, radiographic diagnosis of lameness in the horse.

The afternoon session included Dr. McAuliff—bovine sterility; and a conference on clinical pathology moderated by Dr. David L. Coffin, asisted by Dr. Robert J. Tashjian, both of New York, N .Y. The panel was made up of Drs. McClelland, Riser, and Singleton.

Quebec

COURSE IN CANDLING AND GRADING EGGS OFFERED BY VETERINARY SCHOOL.—For the tenth consecutive year, special courses on preparation and marketing of avicultural products are offered at the School of Veterinary Medicine at Saint-Hyacinthe, Quebec.

These courses are offered through the cooperation of the Division of Aviculture of the provincial and federal departments of agriculture (market services), the provincial Department of Social Welfare and Youth, and the federal Department of Labor.

Theoretic and practical instructions include criteria for choice of best poultry breeds for production of eggs, genetic laws applicable to cross breeding, new methods of production and conservation of quality eggs, method of candling and grading eggs for determination of market value, study of plans for deshelling eggs, bacterial tests for determining quality of the product and its commercial value, and preparation and sale of powdered eggs.

Tennessee

NASHVILLE—Proposed contributions totaling $50 were approved by the Women's Auxiliary to the Tennessee V.M.A. at their January meeting; $10 was designated for the AVMA Research Fund; $25 for the Auburn Student Loan Fund, and $15 for the Auburn Library.

Projects to give tuition assistance to Tennessee students at Auburn and to provide microscopes to Auburn students for a year were tentatively planned.

The Auxiliary's 1961 officers are: Mrs. W. C. Cook, Knoxville, president; Mrs. Orville Galyan, Loudon, vice-president eastern Tennessee; Mrs. Ralph Mobley, Nashville, vice-president, central Tennessee; Mrs. H. W. Connaughton, South Fulton, vice-president, western Tennessee; Mrs. George David, Union Ctiy, secretary; and Mrs. Karon Jennings, Nashville, treasurer.

Mrs. W. C. Cook and Mrs. H. W. Connaughton were selected as delegates to the annual meeting of the Women's Auxiliary to the AVMA.

Mrs. Hugh Lamb, Athens, was appointed chairman of a committee on bylaw revisions which will report at the 1961 meeting.

Texas

COLLEGE STATION—CONFERENCE FOR VETERINARIANS.—The 250 veterinarians who attended the thirteenth annual Texas conference for veterinarians, June 1-3 at the A. & M. College of Texas were urged to specialize more in their practices to keep up with the nation-wide agricultural revolution underway.

Dr. F. H. Oberst of Kansas State University said such specialization is necessary in many areas because farmers and ranchers are no longer as diversified as they once were.

He said veterinarians often set up practices in regions dominated by beef cattle, dairy cattle, swine, or poultry and special services are the best means to meet the situation.

In Kansas, as in other states, infertility is a major problem in the beef and dairy business, Dr. Oberst said. A good example of

a special service to sell in these cases would be regular pregnancy examinations of cows.

Another out-of-state speaker, Dr. Hugh P. Callaway, practitioner at Waverly, Mo., discussed management problems of confinement raising of hogs on concrete. He said concrete slabs should be thoroughly washed down at least every other day. He emphasized proper ventilation in buildings to cut down respiratory ailments and he said ground corn cobs make good bedding in farrowing houses.

The most common problems among confined hogs, he said, are diarrhea, nutritional deficiencies, and cannibalism, the latter trouble usually being caused by boredom and lack of minerals.

Dr. R. W. Moore, assistant professor in the A. & M. College of Texas, Department of Veterinary Microbiology, said a practical system has been worked out which can eliminate virus pneumonia of pigs, a costly disease in swine production.

He described the method as surgical removal of pigs from a healthy sow 5 days before she would normally farrow. The pigs are placed in a disease-free environment for seven days. Then normal bacterial flora are added and the pigs are placed on the ground at 4 weeks of age. Dr. Moore, said the system, in addition to stopping pneumonia, reduces feed costs and is adapted to commercial swine production.

Dr. J. W. Huff of the A. & M. College of Texas, veterinary microbiology department, said research has produced an antigen that is 98 per cent effective in detecting anaplasmosis carriers in cattle. He urged the veterinarians to promote a testing program in their areas. These programs, he said, would involve test and segregation of animals instead of test and slaughter.

A highlight of the conference was a closed-circuit television session on surgical and clinical procedures. Participants were Dr. R. L. Rudy, Ohio State University; Dr. Callaway, Waverly, Mo.; Dr. C. H. Bridges and Dr. A. I. Flowers, both of A. and M. College of Texas.

Other conference speakers, all of the A. & M. College of Texas, were: Drs. A. S. Rosenwald, University of California—poultry practice; L. W. Pessarra, veterinarian with the State Division of Public Health at Austin—public health problems; W. C. Banks—radiographic techniques; L. C. Grumbles—virology and viral diseases, and H. A. Smith—kidney lesions.

College Station—Agricultural Experiment Station Receives Three Staff Members of the A. & M. College of Texas.—Promotion of three staff members to become assistant directors of the Texas Agricultural Experiment Station became effective Sept. 1, 1959. They included: Mr. Victor E. Schember, Dr. Roland J. Hildreth, and Dr. Alvin A. Price who also is continuing as dean of the School of Veterinary Medicine at the A. & M. College of Texas.

The appointment of Dr. Price recognizes the rising importance of research in animal health, Dr. Lewis, director of the Station, said in announcing the promotions. In present and future expansions he will plan and coordinate the research in veterinary medicine. The Station now has 28 research projects in veterinary medicine on the A. & M. College of Texas campus and at field units at Angleton, Sonora, Center, Marfa, and Gonzales.

Dr. Price is a native of De Leon. He graduated from Texas A. & M. first in 1940 and returned after extensive duty in Africa and Europe as an officer in the U.S. Infantry to receive his D.V.M. degree in 1949. He became dean of the School of Veterinary Medicine in September, 1957.

Each of the three new assistant directors is well known as a leader in his profession and as the author of many technical publications and popular articles.—*The Texas A. & M. System News, (October, 1959).*

Wisconsin

Association Officers—The new officers of the Wisconsin V.M.A. are: Drs. Frank Gentile, Wauwatosa, president; E. A. Woelffer, Oconomowoc, vice-president; Edward Pope, Madison, treasurer; and W. J. O'Rourke, Madison, secretary.

• • •

Dr. Q. C. Metzig Is Wisconsin's "Veterinarian of the Year"—At the annual meeting of the Wisconsin V.M.A., Dr. Q. C. Metzig, Oshkosh, was named Veterinarian-of-the-Year.

Dr. Metzig is chairman of the executive board of the Wisconsin V.M.A. and a member of the state board of veterinary examiners and the animal health advisory committee of the state agricultural department.

Dr. Q. C. Metzig (right), Oshkosh, is congratulated by President Burr W. Nussdorfer, Sparta, when he is awarded the "Veterinarian of the Year" plaque at the 44th annual meeting of the Wisconsin V.M.A.

Veterinary Military Service

ARMY VETERINARIANS IN GERMANY

Brig. Gen. Russell McNellis, (ISC '28), chief of the Veterinary Corps, Office of the Surgeon General, U.S. Army, visited the cold storage plant at Kaiserslautern, Germany, during a tour of Army Veterinary activities in Europe. The Kaiserslautern plant is the largest in Europe. Shown here are, left to right, First Lt. Robert E. Allen, 64th Med Det (VFI); Lt. Col. G. B. Little, commanding officer, Kaiserslautern cold stores; General McNellis; Lt. Col. A. F. Allison, commanding officer, 64th Med Det (VFI); and Col. Curtis Betzold, (COR '32) chief, Veterinary Branch, Medical Division, U.S. Army, Europe. General McNellis had attended the joint Army-Air Force Veterinary conference held at Wiesbaden, Germany earlier in May. (U.S. Army Photo by PFC White)

Deaths

Star indicates member of AVMA

C. C. Allen (IVC '14), 72, Selma, Ind., died May 16, 1960, after an extended illness. Dr. Allen spent his entire professional life in Selma.

J. W. Allmon, 89, died in Mansfield, Texas, May 19, 1960. Dr. Allmon was a practicing veterinarian for more than 50 years.

George A. Baker, 95, Brasher Falls, N. Y., died April 21, 1960. He had worked as a veterinarian for over 70 years and was an honorary member of the New York State V.M.A.

Robert Black, about 50, died April 11, 1960, at his home in Las Cruces, N. M.

Dr. Black was once head of the department of animal husbandry at A. & M. College of Texas and was director of the experiment station at New Mexico State University in Las Cruces.

Burton K. Dow (ONT '00), 85, died in Old Saybrook, Conn., April 28, 1960.

Dr. Dow retired from veterinary surgery in Willimantic in 1937. He became well known as a lecturer and was a part-time member of the faculty of the Connecticut State Agricultural College before it became a university. He served the Connecticut V. M.A. as president and as secretary for 14 years. He was also a member of the State Board of Veterinary Registration and Examination and its secretary and treasurer.

Alfred C. Edwards (UP '13), 66, died April 16, 1960, at his home in Erie, Pa. Dr. Edwards had been the federal meat inspector in Erie and once practiced in Union City, Pa., and in East St. Louis, Ill., where he did veterinary research.

Portees H. Gregory (ONT '07), 76, died at his home in Feerguson, Mo., after a heart attack. Dr. Gregory practiced for 30 years in St. Charles, Mo., Florida, and St. Louis, Mo., before his retirement two years ago.

M. R. Hocker (IND '14), 69, died April 30, 1960, at his home in Alexandria, Ind. His son, Dr. Robert J. Hocker, Alexandria, is also a veterinarian. Dr. Hocker practiced in Alexandria for 46 years.

Edwin E. Hufft (KCV '08), 75, Liberty, Mo., died Feb. 13, 1960.

Dr. Hufft was awarded life membership in the Missouri V.M.A. at the end of 50 years of practice in 1958.

Frederick T. Hull (MCK '09), 78, died at his home June 6, 1960, in Fresno, Calif. Dr. Hull was a retired state animal disease control officer.

★**Carrel Lewis Jones** (KCV '12), 71, Salt Lake City, Utah, died May 31, 1960, at his home. Dr. Jones had been associated with the Bureau of Animal Industry until his retirement.

Dewis B. Judson (ONT '99), 89, died in Winsted, Conn., Jan. 29, 1960. Dr. Judson was retired.

★**George F. Jungerman** (KCV '08), died May 14, 1960, in Springfield, Mo., after a long illness.

Dr. Jungerman was retired and had lived in Aurora, Mo., and Hiawatha, Kan. He was active in the Missouri V.M.A. and the AV MA.

Ralph F. Knight (COR '07), 76, died April 30, 1960, in Orlando, Fla.

Dr. Knight was the former regional director of the Department of Agriculture and Markets in Cattaraugus.

William H. Lawes, Jr., (AVC '95), 90, died in Fair Haven, N. J., Jan. 29, 1960. He had practiced for 50 years in Red Bank.

John Morgan Lee, 67, died in Rushville, Ill., three weeks after a heart attack, Dec. 30, 1959. He had been Schuyler county rabies inspector and was a member of the Mississippi Valley V.M.A.

O. Roy Lipe (KVC '09), 78, formerly of Hillsboro, Ill., died in Chula Vista, Calif., Jan. 8, 1960.

Floyd G. Martin (CVC '15), 64, died in Lakeland, Fla., Jan. 31, 1960. Dr. Martin was a past-president of the Florida V.M.A. and had served as Lakeland health officer.

William H. Michaud (GR '14), died May 10, 1960, after surgery.

Dr. Michaud, a retired Beaverton veterinarian, lived in Vestaburg, Mich.

★**Chauncey B. Miller** (CVC '10), 73, died in San Francisco, Calif., April 25, 1960. He was a native of Harlan, Iowa.

Dr. Miller held membership in the California V.M.A., Bay Counties V.M.A., and the AVMA.

Louis J. Miller (McK '10), 79, died May 4, 1960.

Dr. Miller's home was in Waterloo, Ill., where he practiced veterinary medicine for nearly 50 years.

Robert Murray, 84, Springfield, Mass., died Jan. 8, 1960.

Frank McCarty (McK '18), 79, Campbellsport, Wis., died in West Bend, Wis., Jan. 19, 1960.

William V. McGroarty (UP '12), 69, Chelsea, Pa., died after a brief illness, Jan. 9, 1960.

Dr. McGroarty was a retired veterinarian who had been associated with the USDA.

George E. McIntosh (USC '23), 83, Arlington, Texas, died Sept. 27, 1959, three weeks after a stroke.

★**Robert A. McKinney** (COR '20), 66, Dryden, N. Y., died May 26, 1960.

Dr. McKinney, a general practitioner, had practiced in the Dryden area for 40 years.

Charles A. Palmer (ISU '20), 64, a native of Frederick, Iowa, died in Gainesville, Fla., Jan. 28, 1960. Dr. Palmer was retired and had been a president of the Florida State V.M.A.

Alex F. Rank (CVC '06), 77, Manitowoc, Wis., died Jan. 23, 1960, after a heart attack.

Dr. Rank received an award from the Wisconsin V.M.A. in 1959 for 50 years of veterinary service.

John C. Rasmussen (ONT '01), 83, a native of Rock Falls, Ill., died Feb. 23, 1960, in Kissimmee, Fla., where he had been living since 1953.

Dr. Rasmussen had been assistant state veterinarian in Illinois for 23 years and was a member of the Illinois V.M.A., and the U. S. Livestock Sanitary Association.

Frank L. Reese (KCV '11), Woodland, Calif., died Sept. 24, 1957, after a heart attack.

George M. Reynolds (McK '05), 82, Converse, Ind., died in Chicago, Ill., Jan. 5, 1960.

★**W. L. Richards** (CVC '14), 74, Columbus, Wis., died May 17, 1960.

Dr. Richards was awarded one of the two meritorious service awards, the first such awards presented by the Wisconsin V.M.A., in January, 1960.

He practiced 45 years in Morrisonville, Wis., and was a charter member of the W.V.M.A. He was also affiliated with the Dane County V.M.A., the Southeastern V.M.A., and the AVMA.

Osey E. Robinson (IND '13), 74, Bixby, Okla., died Jan. 9, 1960.

Dr. Robinson, retired, was president of the Oklahoma V.M.A. in 1927 and served several terms on the state's veterinary examining board.

Edwin K. Rogers (Major, V.C., U.S. Army, Ret.) (WSC '14), 68, died of carcinoma of the pancreas Dec. 17, 1959, in Evansville, Ind. Burial was in Arlington National Cemetery.

Edgar H. Scott, 82, died Dec. 26, 1959, in Johnson, Vt. He had retired in 1958 after 50 years of practice. He was an honorary member of the Vermont V.M.A.

J. O. Shannon (KCV '10), 72, Midland, Texas, died Jan. 29, 1960. He was a native of Kansas and had been a federal meat inspector prior to moving to Texas in 1938.

Samuel S. Sharp, 86, Cherryvale, Kan., died after a cerebral hemorrhage Jan. 16, 1960.

Glen M. Smith (KCV '09), 72, Pittsfield, Ill., died Jan. 23, 1960.

O. L. Summer (OSU '16), 68, died in Miami, Fla., April 16, 1960.

Dr. Summer had retired from work with the Canton, Ohio, health department.

Willbourne S. Tucker (ONT '98; IND. '02), 87, Waldron, Ind., died Jan. 2, 1960, in Madison, Ind.

William B. Whyte (ONT '27), 68, died of a heart attack Jan. 2, 1960, while driving his car in Richmond, Mich.

Women's Auxiliary

Illinois

Mrs. Wesley Knutson was elected president of the Women's Auxiliary of the Student Chapter of the AVMA at the University of Illinois, Urbana. Mrs. Knutson (seated, left) is replacing Mrs. Raymond Husmann, retiring president (seated, right). Standing behind them are (left to right) Mrs. Philip Rose, outgoing vice-president; Mrs. Robert Kinser, treasurer; Mrs. John Dickinson, secretary; and Mrs. Albert Lewis, outgoing treasurer.

Indiana

FRAN ALLISON ENTERTAINS MICHIANA V.M.A. AUXILIARY.—Fran Allison, Chicago radio and television personality, spoke at a tea attended by about 50 wives of members of the Michiana V.M.A. who were attending a biennial clinic and seminar May 12, 1960, in Elkhart, Ind.

Mrs. Irving Mishkin, representing the Elkhart County V.M.A. Auxiliary; Mrs. Edward Halterman, wife of the acting dean of Purdue University; and Mrs. Harry Magrane of Mishawaka, wife of the Indiana V.M.A. president, were among those who poured at the tea in the Empire Room of Hotel Elkhart.

The combined groups met at a banquet in the evening. Dr. Magrane was toastmaster, and honored guests included Dr. and Mrs. Halterman and Dr. Paul Martin, Elkhart county health officer, and Mrs. Martin.

North Carolina

WOMEN'S AUXILIARY IN ASHEVILLE.—At their annual meeting in Asheville, June 22, 1960, the Women's Auxiliary to the North Carolina State V.M.A. approved the following contributions: $5.00 to the *Auxiliary News*, $25.00 to the library funds of the schools of veterinary medicine at University of Georgia and Oklahoma State University, the AVMA Student Loan Fund, and the AVMA Research Fund, and $150.00 to the North Carolina Veterinary Research Foundation, Inc.

New officers are: Mrs. George R. Armstrong, Charlotte, president; Mrs. G. C. Monroe, Guilford, president-elect; Mrs. Bruce H. Staton, Rocky Mount, first vice-president; Mrs. M. S. Setser, Waynesville, second vice-president; and Mrs. Ralph E. Gandy, Jr., Rockingham, secretary-treasurer.

Mrs. Armstrong appointed Mrs. E. G. Batte, Raleigh, Mrs. J. I. Neal, Southern Pines, and Mrs. D. R. Donahue, Morganton, as delegates to the Denver meeting in August.

A table centerpiece, featuring a miniature replica of a veterinarian with hypodermic needle in hand, caught the attention of Fran Allison (second from left), guest speaker at a tea for the Michiana V.M.A. Auxiliary. With Miss Allison are (left to right), Mrs. L. B. Farnsworth, Litchfield, Mich., president of the Michiana V.M.A. Auxiliary; Mrs. E. C. Hannan, Maple Park, Ill., president of the Illinois Auxiliary; and Mrs. Frank Booth, president of the Women's Auxiliary to the AVMA.

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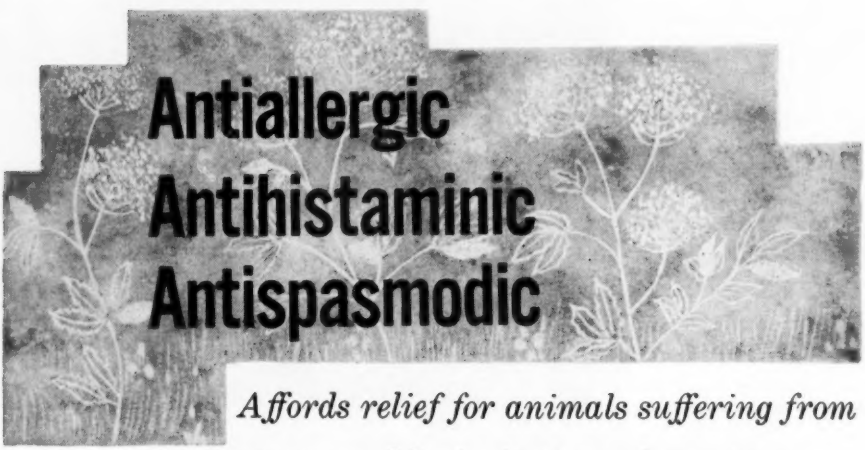

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1. Osborne, J. C. *in* New Horizons in Chemotherapy. Proceedings of First Regional Conference on the Nitrofurans in Veterinary Medicine. In press.
2. Bull, W. S.: N. Amer. Vet. 38: 3 (Jan.) 1957.

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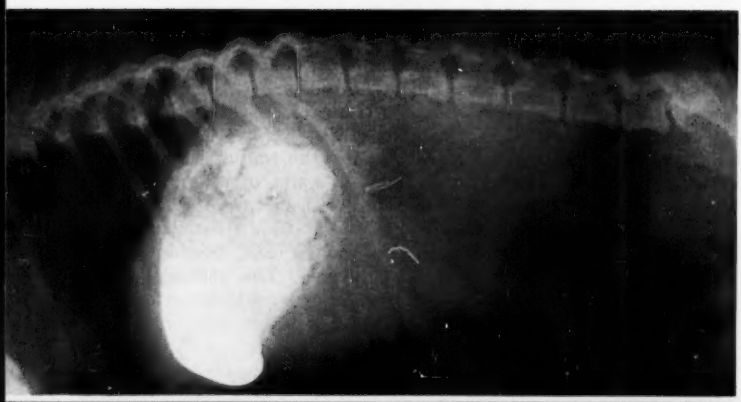

Make your diagnosis from the pictures at the left — then turn the page ▶

Fig. 1—Lateral recumbent radiograph of the Boston Terrier immediately following oral administration of barium solution.

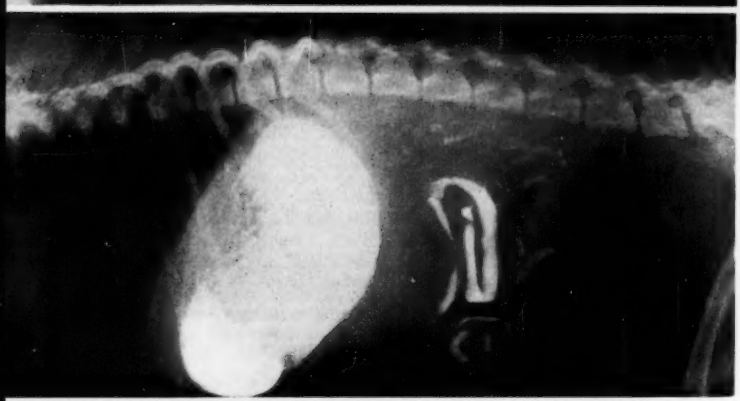

Fig. 2—Lateral recumbent radiograph, one hour following oral administration of barium solution.

Fig. 3—Lateral recumbent radiograph, two hours following oral administration of barium solution.

History.—During the previous 3 weeks, a male Boston Terrier, 6½ years old, had repeated attacks of vomiting 3 hours after eating. Progressive weight loss and moderate polydipsia were also present. The dog's general attitude and desire for food remained normal.

A large, sensitive mass, approximately 10 cm. in diameter, could be palpated in the anterior middle abdominal region. About half of the mass extended anteriorly into the thoracic cage. The dog was given barium solution by mouth and recumbent radiographs were taken to establish whether the lesion was obstructing the intestinal tract. One (fig. 1) was taken immediately following administration of barium solution; another (fig. 2) was taken one hour after the barium solution was given; the third (fig. 3) was taken 2 hours after barium solution was given.

Here Is the Diagnosis

(*Continued from preceding page*)

Diagnosis.—A well-circumscribed mass, with density equal to or slightly more opaque than the liver and spleen, was present immediately posterior to the stomach (fig. 4, arrows). Figure 1 shows the mass to be located adjacent to the dog's stomach and spleen, causing a filling indentation on the caudal side of the stomach. Figure 2 shows only a small amount of barium solution in the intestine after one hour, indicating that the normal rate of passage of the barium solution is retarded. Figure 3 shows prolonged gastric barium retention. It is assumed that the mass is obstructing the opening in the pyloris.

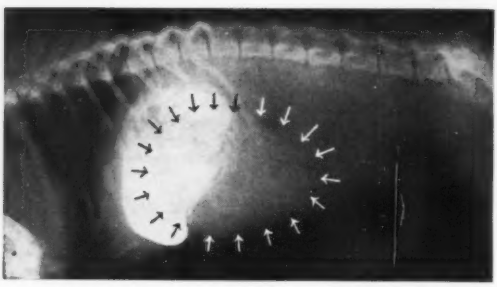

Fig. 4—Lateral recumbent radiograph of the Boston Terrier taken immediately after oral administration of barium solution; arrows outline the tumor mass.

Comment.—At surgery, a large, globoid mass measuring 8.0 by 8.5 by 10.0 cm. was found to be invading the wall of the pyloris and the associated walls of the stomach and intestines. The cut surface of the mass contained small, multiple hemorrhagic cysts. A partial gastric and duodenal resection was performed. The stomach and duodenum were united by side-to-side anastomosis. The dog recovered satisfactorily and has remained well for 7 months. Histologically, the tumor appeared to be a lymphangiosarcoma involving the serosa and invading the muscularis of the pyloris and associated structures.*

---

*Reported by T. C. Jones, B.S., D.V.M., Pathology Department, Angell Memorial Animal Hospital, Boston, Mass.

This case report was submitted by Charles T. Schenck, D.V.M. (formerly associated with Angell Memorial Animal Hospital, Boston, Mass., and now in practice at Needham Heights, Mass.), and was prepared with the assistance of Wayne H. Riser, D.V.M., M.S., Kensington, Md.

Our readers are invited to submit histories, radiographs, and diagnoses of interesting cases which are suitable for publication.

Quiz for Quidnuncs

1. What is bulbocapnine? Page 296.

2. How does heredity influence fetal mummification in cattle? Page 299.

3. Of what value is dihydrotachysterol in preventing relapses in cattle following parturient paresis? Page 302.

4. What were the results of treatments of fractures of long bones in large animals at one college clinic? Page 309.

5. How effective is the veterinary aptitude test in predicting success of veterinary college students? Page 317.

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1. Jones, S. V.; Belloff, G. B., and Roberts, H. D. B.: Vet. Med. 51:413 (Sept.) 1956.

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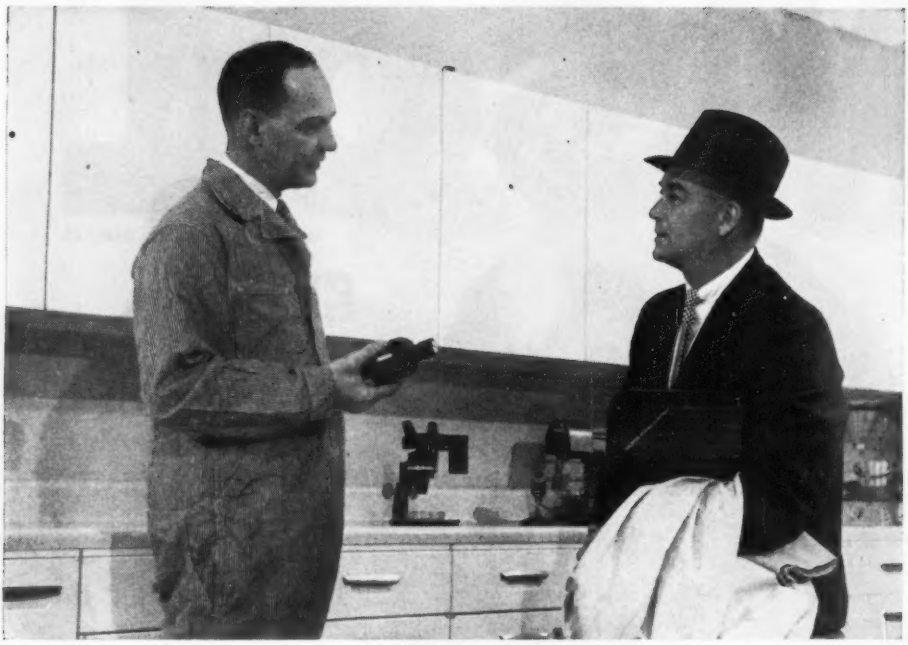

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History of the AVMA

1893

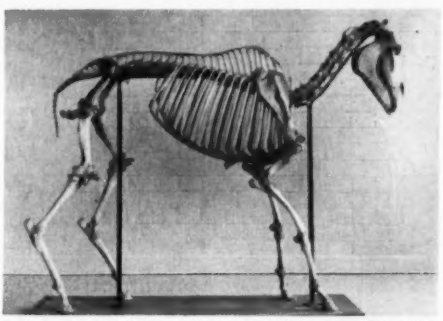
The 30th annual meeting of the USVMA and "First International Veterinary Congress of America" was held in Chicago at the time of the Columbian Exposition. The principal evidence of an international character, however, was the election of 11 foreign veterinarians as honorary members of the Association, and "an honorary membership in the Congress was conferred upon some thirty-three members of the profession, covering some twelve countries." No foreign veterinarians attended.

The Tuberculosis Committee reported that "While it may not be practicable at present to undertake the complete eradication of the disease, each State should at least institute a thorough examination of the herds to determine its prevalence. The question of a radical attempt to stamp it out should be agitated; owners of cattle should be apprised of its dangers, all tuberculous cows should be removed from dairies, and all meat should be subjected to a veterinary examination at the time of slaughter."

W. L. Williams noted an increase in membership by 75 per cent in the past few years. He reported "The chief change [of the Association] has been in regard to the admission of members . . . for the first time in the history of our Association many applicants have been refused admittance." The three-year college requirement, he noted: ". . . excludes from possible membership the future graduates of a vast majority of veterinary colleges in America . . . . Several of these are anxious to have a cloak of respectability thrown over them through the recognition by us of their graduates . . . evidence of the growing power of our Association, and of the correctness of our move for a higher standard of education."

The Committee on Education reported, "Increasing demands for a higher and a more complete education have led to great improvements in our colleges during recent months . . . but we recognize also that there is much room for further improvement." The committee's recommendations were essentially those that had been advocated for some years: ". . . a uniform matriculation examination, which must be rigidly enforced, a uniform curriculum, and a uniform length of study."

The BAI had an extensive and splendid exhibit at the Columbian Exposition depicting its work in the eradication of animal diseases. While the veterinary schools of France had large exhibits, those of the United States were not represented. The agricultural colleges, however, had a large and unified presentation consisting of models, skeletons, pathological specimens, and instruments used in teaching and practice. This was under the direction of Dr. E.A.A. Grange of the Michigan Agricultural College. A horse skeleton, pictured below, was



This horse skeleton was prepared for the Columbia Exposition in 1893. It is still in use at Michigan State University.

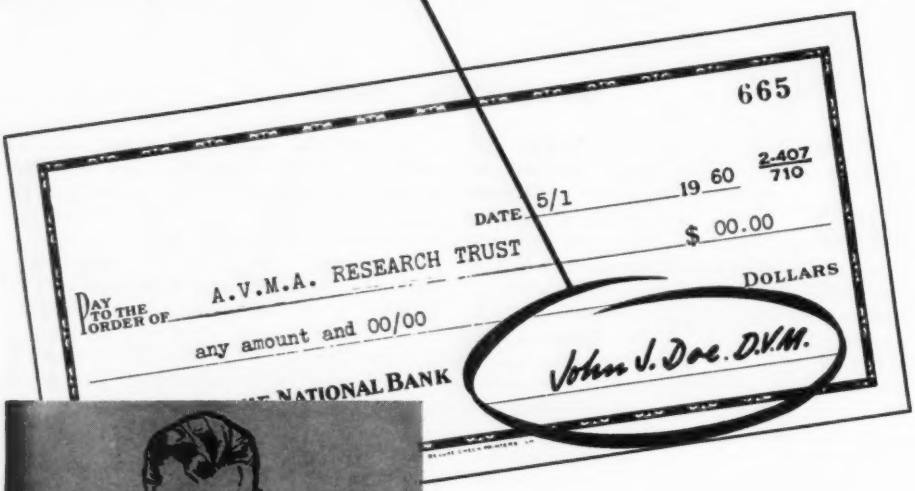
specially prepared for this exhibit and is still in use at Michigan State University.

Papers were read on veterinary history, education, and ethics; hog cholera, periodic ophthalmia, pleuropneumonia, and fistula: meat inspection, inspection of cattle, millet disease in horses, and biliary cirrhosis in cattle.

The matter of incorporation of the Association was again discussed and tabled, over the objections of F. H. Osgood: ". . . we have been procrastinating . . . not for a day, but years." The seal of the Association was adopted as an official emblem. "One the size of a quarter of a dollar for bill-heads and letterheads, and one the size of a dime, which may be used on visiting cards if so desired," but only after incorporation of the Association—which was deferred until 1916.

W. H. Hoskins was elected president, A. W. Clement, vice president, T. J. Turner, secretary, and J. L. Robertson, treasurer.

your name here



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ISOPTO® CARBACHOL — A sterile ophthalmic solution of *carbachol*, in *three strengths*: 0.75%, 1.5% and 3%, in a 1.0% methylcellulose vehicle. All three strengths available in Alcon's 15cc Drop-Tainer® plastic packaging.

A specific agent for chronic and non-congestive glaucoma and advanced glaucoma simplex, *Isopto® Carbachol* is often valuable in cases where other miotics are not effective, or where sensitivity occurs; also, following partially successful surgery. More active than pilocarpine; less frequent application needed; produces greater degree of miosis; comfortable, with little if any corneal irritation.

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A MAJOR FACTOR in the successful control of glaucoma is immediate treatment. It is therefore well to have miotics available in your treatment room. For a discussion of glaucoma in small animals, see pages 5, 6, 32, 33 and 34, *Canine Ophthalmology*, by R. J. Beamer, D.V.M.

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Or write: Alcon Laboratories, Inc., Veterinary Department, P. O. Box 1959, Fort Worth 1, Texas.

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*Anderson, F. B.: Vet. Med. *54*:535, (Oct.) 1959.

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Make comparisons—then you, too, will buy KASCO

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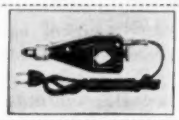
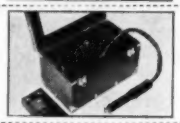


NEW ELECTRIC TATTOO instrument stops "Collie Nose" in a hurry just by tattooing affected area. Send coupon for free folder.

HOSPITAL SIGN LETTERS of bright plastic help you create your own handsome clinic or hospital sign. Custom built signs available. Send coupon for free folder.

NEW VETERINARY CASES of baked enamel over steel will "dress up" your visits to clients. Brass trim, many sizes, geared to serum bottles, instruments. Send for free folder.



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RADIANT HEAT PANEL makes a perfect inexpensive, warm bed for small animals coming from surgery. Shockproof, uses almost no current. You just plug it in. Send for free folder.

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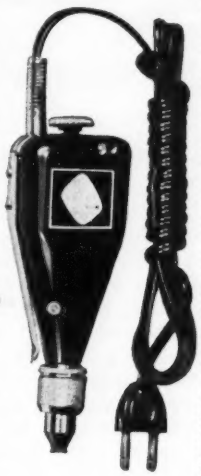
new 10 needle tattoo instrument stops "Collie Nose" symptoms in a hurry



Solar dermatitis, primarily known as "Collie Nose", can be a real problem to treat with lasting results.

Recently, work at the state university here in Colorado showed that tattooing unpigmented areas of the canine's nose with special ink would stop "Collie Nose." Coloring the skin areas stops the irritation of the sun's rays and permits the inflammation to clear promptly and permanently.

Nicholson developed a high-speed electric tattoo instrument with 10 *needles*. This way, whole areas of skin can be tattooed in a hurry and without the usual tedium.

May we send you our new leaflet on the Nicholson electric tattoo instrument? Check the coupon below.

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Public Relations

BRIAN M. FORSTER,
DIRECTOR OF PUBLIC INFORMATION

ADVANCE CONVENTION PUBLICITY

With the completion of the Denver-Hilton Hotel, the city of Denver was host to a number of national organizations holding their meetings for the first time in the "Rocky Mountain Empire." The local newspapers, radio and television stations were very receptive to publicity for these meetings.

Mr. Claude Ramsey, chairman of the publicity and public relations subcommittee of the Committee on Local Arrangements, has the second oldest public relations firm in the veterinary field. Public Relations, Inc. was retained in 1954 by the Mark L. Morris Foundation. Since 1957 it has counseled the Colorado V.M.A. and published the *Rocky Mountain Veterinarian.*

The public relations firm of Savage-Lewis, Inc., Minneapolis, Minn., has the longest record of contact with the veterinary profession. It was retained by the Minnesota V.M.A. in 1954 to help publicize the AVMA meeting there and has been retained since that date by the Minnesota veterinarians.

Through Mr. Ramsey's contacts, local radio and TV newsmen interviewed veterinary personalities during the meeting. Newspaper city editors, farm editors, medical editors, and women's editors had also been informed of the meeting.

State and regional magazine editors were contacted personally, and the representatives of the nation's leading farm publications attended.

In preparation for the meeting, the AVMA Public Information Department prepared "Convention Highlights," which provided background information on the expected attendance, previous dates of meetings in the host city, explanation of activities involving veterinarians, and the topics of the scientific program, classified by areas of lay interest, as livestock editors, poultry editors, pet editors, medical editors, photo editors, and general interest.

This material was provided for the farm, news, feature, and program directors of all local radio and television stations, city and women's editors of local newspapers, with extra copies for the city editor to distribute to his reporters assigned to the meeting. In addition, copies were mailed to national farm, pet, and medical magazine editors and state farm publication editors. Those who could not attend marked the topics in which they were interested in order to receive news releases on the subjects.

The following members of the press attended the AVMA convention:

National: Dave Appleton, *American Cattle Producer*
Mike Bay, *Successful Farming*
Ray Anderson, *Farm Journal*
C. C. Scruggs, *Progressive Farmer*

Regional: Phil Patterson, *Western Farm Life*
Forrest Bassford, *Western Livestock*

Local: Gene Lindberg, *The Denver Post*
Dick Prouty, *The Denver Post*
City Desk, *The Rocky Mountain News*
Chuck Muller, KOA and KOA-TV
Evan Slack, KHOW
Roy Gunderson, KIMN
Del Smith, KLIR

Special requests for material from selected talks have been received from:

Medical World News
Lab World
Maxwell Riddle, *Cleveland Press* reporter and Scripps-Howard Pet Columnist
Breeder's Gazette
Nebraska Farmer
Arizona Farmer-Ranchman
Western Livestock Reporter
Feedstuffs
Cage-Bird Magazine
Dog World Magazine

dependable!..

HYDRODINE

a very palatable, organically bound iodide. When fed at the recommended levels HYDRODINE is safe and non-irritating to the digestive tract

A specific for the treatment of

- ***Actinomycosis Infections***
  Lumpy jaw in cattle
  Fistulous withers in horses
- ***Actinobacillosis***
- ***Infectious Pododermatitis***
  (Foot Rot)
- ***Thyroid dysfunction***
- ***Chronic coughing***

also as an aid in the correction of sterility, chronic udder infections and chronic iodine deficiencies. When fed at low levels Hydrodine will help prevent the occurrence of foot rot.

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SULFABROM SOLUTION 6.25%
to supply your total sulfa

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NEW SULFABROM SOLUTION 6.25% AND SULFABROM BOLUSES ARE THE ONLY SULFAS AVAILABLE EXCLUSIVELY TO VETERINARIANS.

Together, these two forms of SULFABROM will supply you with all you require for sulfa treatment—in the field or in your dispensing. Together, they will serve you with greatest efficacy and economy.

PROLONGED ACTION: Ordinary sulfonamides, including sulfathiazole and sulfamethazine, peak during the first 24 hours after treatment, but then soon fall below the necessary or effective 5 mg./100 cc. level. Not so with SULFABROM SOLUTION or SULFABROM BOLUSES. They can establish and maintain therapeutic blood and plasma levels *for as long as 48 hours* in cattle.

DOSAGE AND ECONOMY: Recommended treatment levels with new SULFABROM SOLUTION are 25-50 cc. per 100 lb. of body weight when injected intravenously and 50 cc. per 100 lb. of body weight when injected intraperitoneally. Cost of treatment per animal is remarkably low—only about 50c to $1.

RESULTS: The following remarks are abstracted from actual clinical investigation reports on the use of SULFABROM SOLUTION on file at the Merck Animal Science Research Department. (1) "*Symptoms:* Recently shipped-in cow. Temperature 106°. Labored breathing. Rales audible over chest area. *Diagnosis:* Pneumonia (shipping fever complex). *Treatment:* 700 cc. SULFABROM SOLUTION in one dose daily for two days. Sixty grams of SULFABROM BOLUSES given at time of I. V. injection. *Results:* Temperature returned to normal in 24 hours". (2) "*Symptoms:* Dystocia with removal by forced extraction of putrified fetus. Temperature 104°. Rapid pulse and breathing. Anorexia. *Diagnosis:* Metritis. *Treatment:* Two doses SULFABROM SOLUTION 700 cc. each. *Results:* Temperature 101.6° in 24 hours. Appetite returning". (3) "*Symptoms:* Foul hoof—limited to 'between the toes' variety with swelling. *Diagnosis:* Foot rot. *Treatment:* 700 cc. SULFABROM SOLUTION *Results:* Eight of 11 animals walked normally in 48 hours with swelling reduced to normal or near normal. Three animals required second treatment and returned to normal in 48 hours."

These quoted reports are typical of those being received from clinical investigators and from veterinarians like yourself. We believe they demonstrate that *the only sulfas available to you exclusively*—new SULFABROM SOLUTION and SULFABROM BOLUSES—are also the most effective you can use.

Merck Chemical Division, Merck & Co., Inc., Rahway, New Jersey.

SOLUTION 6.25%

SULFABROM®

(Sodium Sulfabromomethazine) BOLUSES

VETERINARY

MERCK

The Postman Rides Again

—UPI Telephoto

In Russiaville, Ind., rural mail carrier Gus Clingenpeel had to saddle up to make his mail rounds. A sudden change in temperature caused the roads to fall apart, making the way impassable to everything but the trusty steed.

Ratios of Veterinarians

The ratio of veterinarians to human population has varied only 0.1 of 1.0 per cent since 1920: in 1920, there were 11.5 veterinarians per 100,000 population; in 1958, there were 11.6 veterinarians per 100,000. This compares with 133 physicians per 100,000 in 1958. Another way of expressing this same ratio is that in 1958 there was 1 veterinarian for each 9,177 persons in the United States. This ratio varies widely among the states.

State	1 veterinarian per
Rhode Island	26,656
Georgia	9,921
Alabama	9,427
Florida	9,411
Iowa	2,586

The value of livestock per veterinarian in 1958 was as follows:

North Dakota	$2,322,000.00
Iowa	927,000.00
Alabama	423,000.00
Georgia	398,000.00
Florida	336,000.00
Rhode Island	171,000.00

—Auburn Veterinarian, 16, (Winter, 1960): 79.

AVMA Research Fellowships Available

The Council on Research of the AVMA announces the availability of a number of fellowships for postgraduate training for the academic year, 1961-1962.

The recipient of a fellowship must be a veterinarian and a citizen of the United States or Canada. Veterinary students who expect to graduate at the end of the current school year and who wish to follow a career in research may apply for a fellowship.

It is advisable that completed application forms be filed by Jan. 1, 1961, to allow time for correcting omissions and for some reasonable delay in arrival of letters of information from third parties. The latest date for filing the completed application is Feb. 1, 1961. Approximately one month is required for processing completed applications after receipt by the Council. Qualified persons should secure and submit applications as early as possible to insure their file being complete for presentation to the Committee on Fellowships.

The Committee on Fellowships of the Council on Research will meet early in March to consider applications and the awards will be announced soon afterward. The stipend will be determined in each case by the needs of the individual, the location of the school in which he proposes to work, and other factors. In general, the stipends range from 100 per month upward. Any qualified person interested in graduate training may obtain application blanks and other information from the deans of the various colleges of veterinary medicine or by writing to the Council on Research, American Veterinary Medical Association, 600 S. Michigan Ave., Chicago 5, Ill.

Drug Industry View of Veterinary Medicine

Veterinary medicine has been expanding its scope with giant and dramatic strides.

The drug industry has a huge stake in developments taking place in this field, inasof the features (financial and therapeutic) of human medicine.

For the pharmaceutical manufacturer, veterinary medical practice offers unparalleled opportunities for expansion in terms of service, volume, and profit. It's a growth field all in itself and warrants greater emphasis for its greater future.—*Drug Trade News, 35, (March 7, 1960): 38.*

Dogs in your care require complete nourishment

Ideal Dog Food

is

U.S. Government Inspected

–completely nourishing

This seal is your guarantee that Ideal is packed under clean and sanitary conditions—is completely nourishing—is always properly balanced.

Packed Under Continuous Inspection of U.S. Dept. of Agr.

Did you know only 5 out of 500 dog foods are inspected by the U.S. Government—that these brands are completely nourishing?

Ideal, manufactured under continuous U.S. Government Inspection, is completely nourishing because of the proper blend of the high quality ingredients used to comply with Wilson & Co. as well as U.S. Government standards.

A leading midwestern research laboratory reports feeding Ideal *shortened* the time necessary to restore dogs to health, even though they were malnourished and had acute and chronic diseases.

So feed and recommend Ideal Dog Food with complete confidence.

Wilson & Co., Inc., Chicago, Illinois—Meat Packers

Dr. J. F. Alberson Appointed Hill Packing Representative

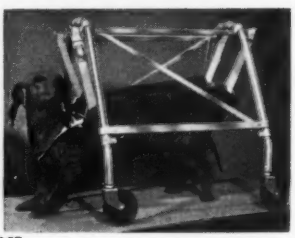
Dr. James F. Alberson (COL '51) has recently been appointed a representative of

Dr. James F. Alberson

Hill Packing Company's "Prescription Diets" in the southwestern area.

Dr. Alberson has had several years of experience in small and large animal practices and regulatory work in Oklahoma.

HOW TO HANDLE THE PARALYTIC PET DURING CONVALESCENCE



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2) Saves time and labor necessary to rehabilitate paraplegics by massage, forced exercise, and constant supervision of the attendant.
3) Eliminates pressure sores, unsightly denuded areas, and self-mutilation due to lack of movement.
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5) May be rented out to clients who wish their pet to spend his convalescence at home.

Sold to Veterinarians only

Adjustable Dog Walker $50 (Freight added).
Satisfaction or money back in thirty days.
Send check or money order to

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The Problem of Overpublication

The number of new scientific journals taken by the Science Museum Library in England is increasing at the rate of about 700 a year, or nearly two new journals a day. The reason for the increase is that more money is being spent on scientific research. However, the increase in the number of journals does not mean that scientists are reading more. Inquiry has shown that few individual scientists read regularly more than 3 or 4 scientific journals.

Although there should be sufficient journals to insure the prompt publication of worthwhile research, we are reaching a stage where there is so much printed matter that many become reluctant to read anything. There are several reasons why our printed matter has become so bulky. One is that some workers publish the same material several times — first in a preliminary communication, then in various papers in national and international journals, and again with minor modifications in congress reports and symposium volumes. Another reason is the insistence by university and other committees that those attending meetings should give a paper in order to justify their expenses. Temporary research grants also stimulate unnecessary publication since a research worker often feels that he must publish a paper to ensure the renewal of his grant.

Perhaps what we need is a higher standard of refereeing to check duplication and raise the general standard of publication. Perhaps there is a need to return to scientific ethics to ensure that a paper accepted for publication is really worth publishing. Perhaps we should more aggressively fight the tendency in some circles to judge a man by the quantity rather than the quality of the work he publishes. Perhaps, as one professor has suggested, scientists should be permitted to publish only 1 paper and 1 preliminary report a year.—*Nature, 186, (April 2, 1960): 18.*

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Moderately Priced

The new Cameron 255 the most efficient time-saving unit for veterinary practice. Speeds surgery, permits faster healing. Tube generated current cuts and coagulates, yet healing occurs by first intention in most major or minor surgery. The 255 is a complete set, with diagnostic light outlet and a wide variety of attachments to suit your needs. Price complete with accessories for large or small animal surgery **$199.** Try the Cameron 255, now in your office without cost or obligation. Learn how much time *you* can save. See how the 255 enables you to improve techniques in many operations. When the 255 has proven its merit and only then, we will send you an invoice. Your cost if not satisfied—transportation from Chicago and return.

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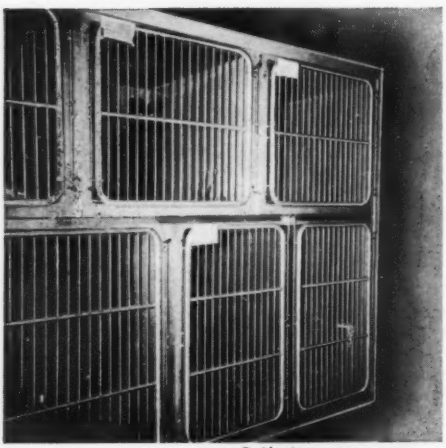
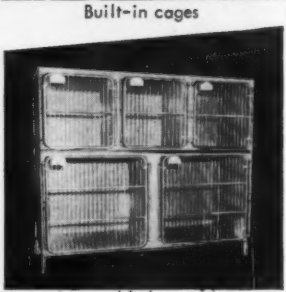
now know the comfort, cleanliness and fine appearance of their temporary homes in the ORIGINAL time-tested

GLASS—PLASTIC ANIMAL CAGES



Built-in cages



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Before you install new cages WRITE TODAY for information on these modern cages . . . molded, seamless construction for minimum maintenance . . . with the door to last a lifetime.

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Vashon, Washington

Coming Meetings

Notices of coming meetings must be received 30 days before date of publication.

Minnesota, University of. Postgraduate conference for veterinarians. Room 125, Veterinary Clinic Building, St. Paul Campus, St. Paul 1, Minn. Sept. 14, 15, 1960. George W. Mather, professor, Division of Veterinary Medicine and Clinics.

Central Indiana Veterinary Medical Association. Annual small animal seminar. Claypool Hotel, Indianapolis, Ind., Sept. 14, 1960. P. T. Parker, 5901 Crawfordsville Rd., Speedway 24, Ind., chairman.

New York State Veterinary Medical Society. Sixty-ninth annual meeting. Hotel Syracuse, Syracuse, Sept. 14-16, 1960. Joan S. Halat, New York State Veterinary Medical Society, 803 Varick Street, Utica, N. Y., assistant executive secretary.

Ninth U. S. Civil Defense Council Conference: Medical Health Section. Leamington Hotel, Minneapolis, Minn., Sept. 21-22, 1960. Dr. Carroll P. Hungate, 535 Argyle Building, Kansas City 6, Mo., chairman.

West Virginia Veterinary Medical Association. Annual meeting. Shenandoah Hotel, Martinsburg, West Va., Sept. 25-26, 1960. Dr. Harry J. Fallon, 200 Fifth St. West, Huntington, West Va., secretary.

American Veterinary Radiology Society. Annual Film Reading Session with speakers. 1 p.m., E.S.T., Sept. 25 1960. Hotel Elkart, Elkhart, Ind. J. J. Fishler, Elkhart, Ind., secretary.

American Humane Association. Annual convention. La-Salle Hotel, Chicago, Ill., Sept. 26-28, 1960. Mr. R. T. Phillips, 896 Pennsylvania St., Denver 3, Colo., executive director.

Armed Forces Institute of Pathology. Seventh annual course. Armed Forces Institute of Pathology, Washington, D.C., Sept. 26-30, 1960. Deadline for applications is August 15. To apply, write: The Director, Armed Forces Institute of Pathology. Washington 25, D.C.

Illinois Conference and Extension Short Course for Veterinarians. College of Veterinary Medicine, University of Illinois, Urbana, Oct. 6-7, 1960. Dr. L. E. Boley, Chairman 1960 Veterinary Conference.

Helminthological Society of Washington. Fiftieth anniversary. Scientific program will be conducted at the University of Maryland, College Park, Md., Oct. 8, 1960. Helminthological Society of Washington, Animal Disease and Parasite Research Branch, ARS, USDA, Beltsville, Md., publicity committee.

Gaines Dog Research Center. Tenth annual symposium. Kankakee Civic Auditorium, Kankakee, Ill., Oct. 12, 1960. Dean C. A. Brandly, School of Veterinary Medicine, University of Illinois, Urbana, Ill., chairman.

Purdue University. Forty-eighth annual conference for veterinarians. School of Veterinary Science and Medicine, Purdue University, Lafayette, Ind., Oct. 12-14, 1960. Erskine V. Morse, dean.

Eastern Iowa Veterinary Association, Inc. Forty-seventh annual meeting. Hotel Montrose, Cedar Rapids, Oct. 13-14, 1960. Charles B. Thayer, Medical Laboratory Center, S. U. I., Iowa City, Iowa, secretary.

New England Veterinary Medical Association. Twenty-sixth annual meeting. Sheraton Biltmore Hotel, Providence, R.I., Oct. 16-19, 1960. L. T. Maloney, New England V.M.A. Consultant, 6 Beacon St., Boston, Mass.

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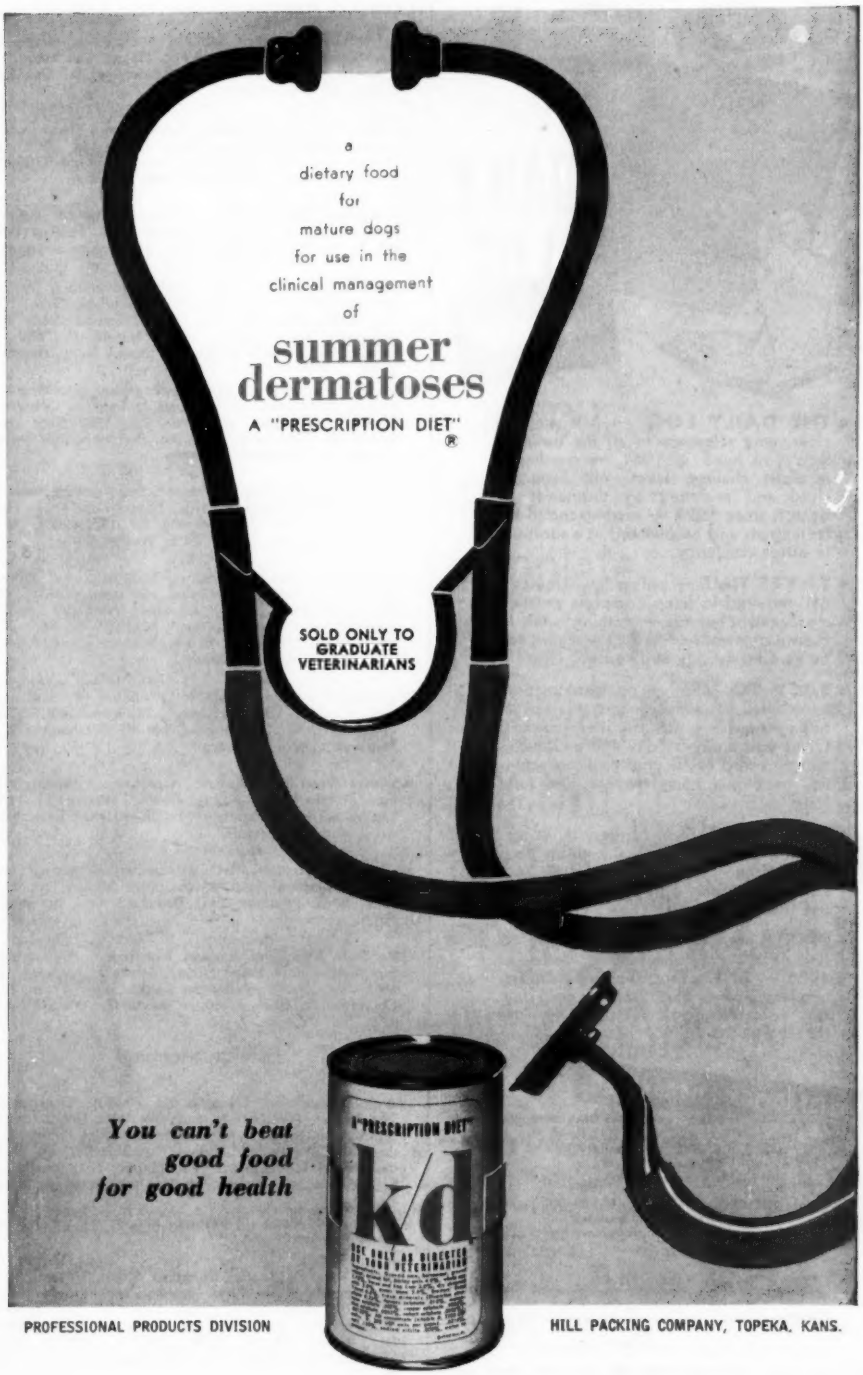

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COMING MEETINGS—continued from adv. p. 48

United States Livestock Sanitary Association. Sixty-fourth annual meeting. Daniel Boone Hotel, Charleston, W. Va., Oct. 19-21, 1960. R. A. Hendershott, 33 Oak Lane, Trenton 8, N.J., secretary.

Southern Veterinary Medical Association, Inc. Annual meeting. Francis Marion Hotel, Charleston, S.C., Oct. 23-26, 1960. Otto M. Strock, 461 Maybank Highway, Charleston, S.C., general chairman.

Animal Care Panel. Annual convention. Sheraton-Jefferson Hotel, St. Louis, Mo., Oct. 26-28, 1960. Herbert Graff, 835 S. 8th St., St. Louis, Mo., convention secretary.

Cornell University. Annual nutrition conference for feed manufacturers. Statler Hilton Hotel, Buffalo, N.Y., Nov. 2-4, 1960. For programs, preregistration and hotel reservation cards, contact: Prof. Harold H. Williams, Savage Hall, Cornell University, Ithaca, N.Y., chairman.

Missouri, University of. Thirty-sixth annual veterinary conference. University of Missouri, School of Veterinary Medicine, Columbia, Mo., Nov. 7-8, 1960. Cecil Elder, School of Veterinary Medicine, Veterinary Pathology, University of Missouri, chairman.

Arizona Veterinary Medical Association. Annual meeting. Safari Hotel, Scottsdale, Ariz., Nov. 13-15, 1960. Elmer B. Powell, 1102 S. Scottsdale Rd., Scottsdale, Ariz., local arrangement (phone—WH 5-6479).

Veterinary-Nutrition Conference. Sponsored by Midwest Feed Manufacturers Association and Iowa, Kansas, Missouri, Oklahoma, and Nebraska Veterinary Medical Associations. Continental Hotel, Kansas City, Mo., Dec. 12-13, 1960. Dr. James Bailey, Walnut Grove Products Co., Atlantic, Iowa, chairman.

Wisconsin Veterinary Medical Association. Forty-fifth annual meeting. Schroeder Hotel, Milwaukee, Wis., Jan. 15-17, 1961. W. J. O'Rourke, 540 W. Washington Ave., Madison 3, Wis., secretary.

Arkansas Veterinary Medical Association. Annual meeting. Hotel Marion, Little Rock, Jan. 22-24, 1961. Thayer D. Hendrickson, 7824 Cantrell Rd., Little Rock, Ark., secretary-treasurer.

Minnesota Veterinary Medical Association. Annual meeting. Leamington Hotel, Minneapolis, Minn., Jan. 23-25, 1961. B. S. Pomeroy, 1443 Raymond Ave., St. Paul 8, Minn., secretary.

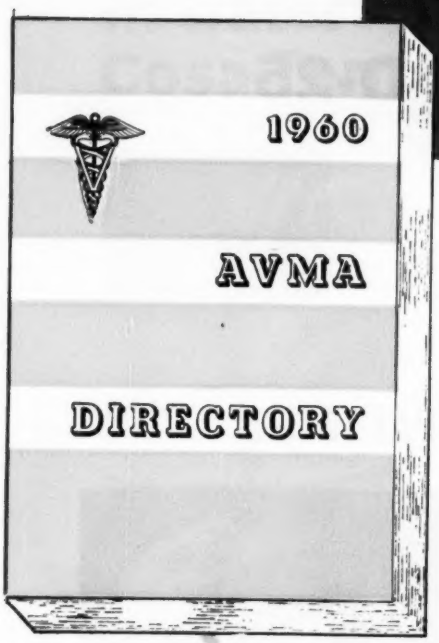
Ohio State Veterinary Medical Association. Annual meeting. Commodore Perry Hotel, Toledo, Ohio, Feb. 5-8, 1961. Dr. R. E. Rebrassier, 1411 West Third Ave., Columbus 12, Ohio, executive secretary.

Foreign Meetings

Fourth International Congress on Animal Reproduction. The Hague, Netherlands, June 5-9, 1961. For additional information contact: the Secretariat of the Fourth International Congress on Animal Reproduction, 14, Burgemeester de Monchyplein, The Hague, Netherlands, Dr. L. Hoedemaker, secretary to the organizing committee.

Eighth International Congress of Animal Husbandry. Hamburg, Germany, June 13, 1961.

Twelfth World's Poultry Congress. Show Grounds of the New South Wales Royal Agricultural Society, Sydney, Australia, Aug. 13-18, 1962. Dr. Cliff D. Carpenter, chairman, U. S. Participation Committee, 1207 Emerald Bay, Laguna Beach, Calif.; Dr. A. William Jasper, secretary, c/o AFBF, 2300 Merchandise Mart, Chicago 54, Ill.



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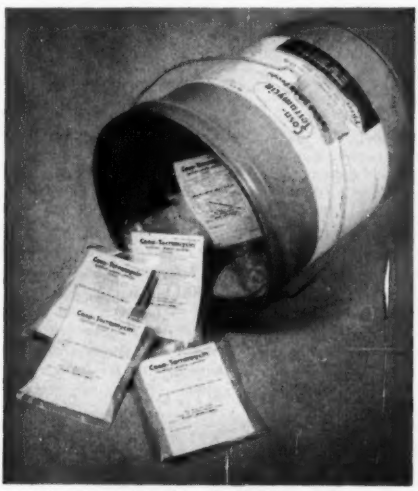

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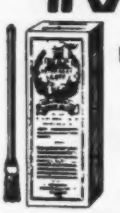

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Associate veterinarian wanted in active large animal practice in Alberta, Canada. Opportunity to take over practice. Some real estate. Give age, previous engagements and initial salary expected. No provincial board examinations required in Alberta for graduates from accredited colleges. Address Box H 54, JOURNAL of the AVMA.

Wanted—veterinarian to work with artificial breeding business, general practice in large purebred Holstein herd and cattle sales business. Background in biochemistry or animal pathology preferred. Located near Watertown, Wis. Contact Piper Bros. Farms, Watertown, Wis.

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Wanted—associate veterinarian for mixed practice in Central Oklahoma. State qualifications and salary requirements. Address Box G 56, JOURNAL of the AVMA.

Wanted—Positions

Graduate (KSU '57), married, completing military service October, 1960, desires position in mixed or small animal practice. Licensed in Kansas, Missouri, Iowa and California. Address Box J 6, JOURNAL of the AVMA.

European veterinarian (graduated in Poland in 1952) seeks assistant position in mixed practice. Married, 33. Address 11975 Branford, Sun Valley, Calif.

Wanted—small animal position on salary or commission basis. 1957 graduate. Have Michigan and Minnesota licenses. Will apply for others if necessary. Available around Labor Day. Address Box J 1, JOURNAL of the AVMA.

Minnesota graduate desires small animal hospital position Minnesota, Wisconsin, Florida, Michigan. Age 27, available in October. Married. Address Box H 64, JOURNAL of the AVMA.

Graduate (GA '58), desires position with small animal practitioner. Licensed in Georgia and Florida. Military obligation completed in September. Address Box H 65, JOURNAL of the AVMA.

Graduate (UP '58), married, 2 children, fulfills service obligation in October, desires position with future in small animal practice. Licensed in Pennsylvania, New Jersey and Delaware. Address Box J 8, JOURNAL of the AVMA.

Graduate (COL '58), married, fulfills service obligation in September, desires position with work and future, mixed or small animals. Licensed in Colorado, California, Kansas, Wyoming. Address Box E 54, JOURNAL of the AVMA.

European veterinarian, fluent English, with 3 years' experience in small animal practice, desires position with future in small animals. Address Box J 9, JOURNAL of the AVMA.

Graduate (API '58) fulfills service obligation in September, desires 1 year in progressive small animal or mixed practice in Florida. Florida license. Address Box J 11, JOURNAL of the AVMA.

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For sale—thriving practice in central Wisconsin. 85% dairy with the balance, other. Gross in excess of $30,000. Modern ranch home and hospital. Radio, drugs, and equipment included. Terms. Sale price—$29,500. Address Box H 50, JOURNAL of the AVMA.

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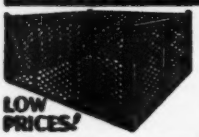

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